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Any Progress?

SINCE the special Advisory Panel on the British Transport Commission was set up under the chairmanship of Sir Ivan Stedeford, singularly little has been heard of the progress, if any, that it is making in its quest for proposals to increase the efficiency of British Railways and the associated enterprises of the British Transport Commission. It is common knowledge that members of the Panel have had numerous meetings, both with individuals and bodies within the B.T.C. organisation. It is anyone's guess as to whether the information it has received has been unanimous or contradictory. The impression that has been made on the Panel is even more conjectural. What is beyond dispute is that the very fact of having an inquisition of this kind at work at the present time is having an extremely bad effect on the morale of railwaymen in general, and particularly, perhaps, on those on whom must fall the burden of operating so great an organisation under conditions which were already difficult enough. The active participation of a Treasury representative in the work must engender uneasiness as to the direction in which the Panel's mind is working. There has, as yet, been no clear indication as to the term which the Panel is to serve and this in itself is a disquieting feature. By reason of the terms of reference given in the House of Commons, it must be assumed that it is under an obligation to prepare a report to the Government by the late summer, and, here again, the fact that that report is unlikely to be published can hardly be expected to commend itself to the unprejudiced observer and even less so to the active participant in railway affairs. That the Government should see fit at this juncture, when the first major fruits of the great long-term modernisation scheme are beginning to mature, to instigate an operation of this kind, is a deplorable example of the ineptitude of the politician in the hurling of spanners into works. It is surprising that the present Prime Minister, who is not unversed in railway affairs, should have sanctioned this course. The railways' need was never greater for a period free from interference during which responsible railway officers could get on with their job without interference and diversion of effort.

Sir Ralf Emerson

WITH the approach, next October, of Nigerian independence it is natural that the Nigerian Council of Ministers should appoint a Nigerian to succeed Sir Ralf Emerson who relinquished that appointment last week. Sir Ralf Emerson has held the position since 1955, when, on the formation of the Nigerian Railway Corporation, he became the first Chairman and General Manager. In July, 1958, he handed over the office of General Manager to Mr. R. K. Innes. Since then he has resided in Great Britain, returning to Nigeria when necessary to deal with the affairs of the Corporation. During his term of office the development and achievements of the railway have been considerable. He was responsible for the inauguration of the extension of the railway into Bornu Provence—for a paper on which he was recently awarded the George Stephenson Medal of the Institution of Civil Engineers. New construction is not the only major change that has taken place under his jurisdiction; diesel-electric traction has been introduced and a carrier telephone system installed, and passenger and freight traffic have increased. The satisfactory changeover from European to Nigerian control owes much to the organising ability of Sir Ralf Emerson.

Of Interest to Railway Industrialists

THE British Mining Equipment Export Association will interest many companies specialising in the production of railway equipment for this so often is of value in mines. Its primary aims are to tackle problems involving Government and financial agencies at home and overseas and to provide facilities for collective market intelligence and sales promotion. The organisation, the interests of which so closely approximate those of U.K.R.A.S.—to which body a leader was devoted in our October 23, 1959 issue—will also give that impartial advice for which British consultative engineering is famous and on which so much achievement has been based. Another important function will be the despatch to promising sites of top-quality engineers—an essential operation in these times of strong competition, and one often of prohibitive cost to a small company. The Association, which was mooted in July, 1959, by 10 founder-members, now has been joined by 33 companies which include such concerns as Edgar Allen & Co. Ltd., G.E.C., Dowty Mining Equipment Limited, Sheepbridge Equipment Limited, and A. Reyrolle & Co. Ltd. Further details are given in the Personal section and a news paragraph this week.

Overseas Railway Traffics

EAST AFRICAN Railways & Harbours total earnings from railway and harbour services in the month of March, 1960, were approximately £2,097,000 compared with £2,039,000 in the same month last year. The approximate railway revenue for the month amounted to £1,658,000, an increase of £14,000 compared with March, 1959. Earnings from passenger, livestock, hotels and catering, and road services fell by £10,000, £5,000, £900 and £10,000 respectively. The main increase was in receipts from goods traffic which were £33,000 higher than in March, 1959; other coaching traffic showed an increase of £700, inland marine of £2,000, and miscellaneous revenue of £3,000. Operating revenues of the

Canadian National Railways for the month of March, 1960, amounted to $62,780,000. Expenses, taxes, and rents totalled $61,456,000 resulting in a net operating income of $1,324,000. In March, 1959, operating revenues were $62,658,000; expenses, taxes and rents were $61,396,000, and the net operating income was $1,262,000. Costa Rica Railway receipts for April amounted to colones 1,964,146 compared with colones 2,419,242 in April, 1959, a decrease of colones 455,096.

Vandalism in the Southern Region

DURING the last month alone there were 5,472 separate cases of deliberate damage on British Railways, Southern Region, trains. They ranged from cut luggage rack nets to completely wrecked compartments with badly slashed seats, smashed panelling and windows, and broken armrests. This was announced at a conference last week by Mr. C. P. Hopkins, the General Manager of the Region, who spoke of "the unfair deal the Southern is receiving from a minority of the travelling public." During the first three months of this year the Bill for making good the damage was £11,269, and the repairs took 14,250 man hours of skilled labour. Most of the damage was concentrated on the suburban and electric main-line services and occurred during the late evening. The Region's services are run with no more reserve stock than is necessary to allow for normal overhauls and to keep trains in good maintenance and order. The withdrawal of stock because of deliberate damage results in the reduction of the formation of many trains and in some cases cancellation.

Standardisation of Oversea Railway Equipment

A GOOD measure of agreement was reached on a wide range of subjects, discussed between delegates from eight oversea countries, at the Sixth London Conference on the Standardisation of Mechanical Equipment on Oversea Railways, held at the Crown Agent's Office, Millbank, on May 23-30 and opened by Sir Stephen Luke, Senior Crown Agent. The chair was taken by Sir Reginald Taylor, Engineer in Chief, Crown Agents, and discussions were led by Mr. D. C. Brown, Chief Mechanical Engineer, who presented a report of the work of the Secretariat since the 1958 conference. The 1960 agenda included subjects which have been further developed since 1958 and some entirely new ones introduced at the suggestion of individual Member railways. Typical among the new subjects discussed were the standardisation of vacuum brake components supplied by different manufacturers, the interchangeability of diesel engines on railcars, standard container sizes for economic transport on existing flat wagons, and equipment available for purifying water on rolling stock. General equipment and auxiliary electrical controls in coaching stock were typical of the problems for which solution was sought during visits to manufacturers' and railway plant. Further reference is made elsewhere in this issue.

Continuing the Good Work in India

THOSE, mainly retired, officers of railways in the Indian sub-continent who at their annual dinner last Monday heard Brigadier C. A. Langley relate his heartening impressions of his recent tour of India, may rightly feel proud. The impressions were those of an acute observer. Brigadier Langley, now Chief Inspecting Officer of Railways, Ministry of Transport, was trained, and served as an instructor, in railway matters as an officer of the Royal Engineers, was seconded in 1927-33 to the then Great Indian Peninsula Railway in connection with electrification, and served in India in the last war as D.Q.M.G. (Movements & Transportation), Allied Land Forces, South East Asia Command. When he re-visited India last December, as recorded in our March 18 issue, and mentioned briefly elsewhere this week, he was greatly struck by the continued efficiency of the railways, by the *esprit-de-corps* of the staff, and by the crusading spirit abroad. What has been and is being done in India could not have been achieved unless good foundations had been laid. Serving officers of Indian railways today owe much to the British, and retired Indian, officers who trained and guided them earlier in their careers, and the debt of India and Pakistan to those who created, developed, improved, and supervised the operation and maintenance of their railways, is incalculable.

Passenger Timetables

PUBLICATION of passenger timetables only a few days before the service comes into force means that supplements must be issued almost immediately, notifying alterations necessitated since timings were compiled. On British Railways, engineering and other works in connection with modernisation demand changes during the currency of the timetable. The complexity of operation necessitates compilation months before inauguration of the service. The Regional timetables are printed in rotation, and late publication is the result mainly of delays in printing over which the railways have no control. The London Midland Region timetable, the last of the six Regional issues, was being distributed as we went to press, only 12 days before the start of the service. The disadvantages of this are stated by a correspondent this week. As to the date of commencement of the summer service, mid-June is probably the best compromise. Additional trains must be introduced even before Whitsuntide, but it is doubtful whether traffic would justify a full summer service before mid-June, and many trains are introduced later. The amount of traffic with the Continent does not warrant synchronisation with introduction of the European summer services, which came into force this year on May 29.

Extension of French 1,500 V. d.c. Electrification

ACCELERATIONS on the Paris-Marseilles main line of the Mediterranean Region of the French National Railways which took effect last Monday, are the result of extension, last month, of electrification at 1,500 V. d.c. from Valence to Avignon and Tarascon. The " Mistral," leaving Paris Lyon at 1.10 p.m., reaches Marseilles at 8.39 p.m., in 7 hr. 29 min. for the 536 miles, and the 461 miles from Paris to Avignon are covered in 6 hr. 6 min. Conversion in the near future of the 60-odd miles from Tarascon to Marseilles, with certain lines in the port area, will complete the scheme for electrification at this voltage in the South of France, at least for the time being. The section from Tarascon to Nîmes also has been converted at 1,500 V., which affords a connection, the only one south of the Paris area, between the 1,500-V. electrified lines of the South Western (Paris–Bordeaux–Pyrenees–Toulouse–Narbonne) and South Eastern and Mediterranean Regions. Conversion beyond Marseilles along the Riviera, if it takes place, may well be at 25 kV., a.c.

Refrain from Spitting

THIS and other excellent injunctions are given in a booklet produced recently by the Publicity Department of the Southern Region of British Railways for the Region's Medical Department. Prefaced with a foreword by Dr. Betty Hobbs, D.Sc., Ph.D., Dip.Bact., F.R.S.H., it aims to prevent the contamination of food with harmful bacteria at all stages of production and to ensure that those bacteria which do reach food, despite all precautions, will not be able to multiply. Rightly kept factual and unfacetious, the text covers the protection of food, personal cleanliness, illness, equipment, and temperature regulations. Treatment is concise and contained in the minimum amount of space. Although the serious nature of the subject has determined a straight treatment, this has been given an attractive lift by Leo Newman's clever and amusing line illustrations, two of which are reproduced in this week's " Scrap Heap." Printed by C. M. D. Printers Limited of London and Chatham, the booklet is distributed free to all concerned within the Region.

Layout Changes for Electrification

BESIDES requiring modifications of track layout to allow higher speeds, electrification may make it possible to simplify existing arrangements by dispensing with certain lines. There is an example of this in work now in progress at Blesme-Haussignemont, the junction for Chaumont on the Est-Paris electrification of the French National Railways. Here two relief lines formerly extending from Vitry-le-Francois to Sermaize-les-Bains are being removed except in the station itself, and a short additional platform loop provided. A former double-track connection between the main Strasbourg lines and those to Chaumont, which used to fly over the relief lines, is being

restored, but as a single-track flyover enabling down trains to join the Chaumont line without crossing the paths of up trains from the Strasbourg direction. Improvements are also being made in the main-line alignment to raise the speed limit to 88 m.p.h. The study of traffic requirements with electrification, which has shown these changes to be practicable, will be repaid by savings in overhead equipment and in future permanent way maintenance. In making the necessary changes in signalling, the opportunity will also be taken to concentrate the working in one box with an electric power frame, replacing the present two main boxes and one temporary box. The realigned up main line from Strasbourg and a new connection into it from the up Chaumont line will pass through the site of one of the existing main boxes under the new arrangements.

Irregular Procedure at Occupation Crossing

"THE fact that an irregularity has become a custom does not make it any less irregular." These words from the report of the Inspecting Officer, Colonel J. R. H. Robertson, on the collision between a diesel train and a lorry at Stobswood Occupation Level Crossing provides the key to this accident, in which the driver of the diesel train lost his life. Despite instructions to the contrary, the crossing keeper allowed the lorry to proceed over the line, although the up line block indicator showed that the signalman in advance had already accepted the diesel train. The instructions stated clearly that in these circumstances the crossing keeper must get leave from the signalman before opening his gates. Instead, he used his own discretion, thereby following an irregular practice which had grown up at this crossing.

Strengthening Railcar Front Ends

BEARING in mind the nature of the lorry and its load, Colonel Robertson thinks that the driver would have been killed even if his cab had been a good deal stronger. The British Transport Commission, Colonel Robertson points out, is considering the practicability of strengthening the front ends of future diesel railcars with a view to increasing the protection for drivers. The accident at Stobswood Crossing also showed the protective value of toughened glass, and Colonel Robertson states that all transverse partitions in British Railways diesel railcars are in future to be fitted with this material. He observes that the arrangement of the gates at the crossing was unsatisfactory, but that they are being altered. Finally when this line of the North Eastern Region is re-signalled, the crossing will be fully protected and controlled by the neighbouring signalbox. Meanwhile the present instructions should ensure safety, if they are strictly enforced. The problem of strengthening the front ends of railcars, to increase the protection for drivers in the event of an accident, complicates that of reducing the weight of the vehicle to the minimum. British designers have tended to favour solidity.

Aluminium in Railway Rolling Stock

EVIDENCE of increasingly widespread recognition for aluminium as a major constructional material for rail vehicles was reflected in the degree of well-informed support given in London on May 27 to formal discussions on the subject. These took place at the symposium on "The Use of Aluminium in Railway Rolling Stock," held jointly by the Institution of Locomotive Engineers and the Aluminium Development Association in accordance with the very comprehensive programme summarised in our April 29 issue and attended by over 250 including numerous representatives from oversea countries.

One of the 13 papers discussed was "General Aspects of Design in Aluminium Alloys," by Mr. J. F. Thring. In this it was suggested that differences in usage between Britain, on the one hand, where there is specialisation in the manufacture of aluminium passenger stock and, on the other hand, Continental Europe and North America, where the accent has been on aluminium freight wagons, may be dependent on the form and severity of competition from other means of transport in the countries concerned. At present aluminium alloys have not reached the stage when they are a natural choice of material for coach construction and there is little doubt that price is the greatest single obstacle to their occupying such a favourable position. From the railway operator's point of view a reduction in weight coupled with increased resistance to corrosion are particularly attractive, sufficiently so usually to justify additional cost provided the extra can be stated accurately by the designer and the railway is in a position to assess the value of the reduced weight and maintenance.

The advantage of weight-saving in vehicles by the use of aluminium gives to the operator of intensive electrified city services the choice of operating trains: (*a*) without increase in capacity or speed but obtaining a reduction in energy consumption; (*b*) of greater capacity without change in speed or energy consumption; or (*c*) at higher scheduled speeds without change in train capacity or energy consumption. For passenger and goods trains operating over longer main-line routes in mountainous regions the capacity of the route can usually be increased by the lengthening of trains.

One of the points which received most attention in Mr. Thring's paper was the emphasis placed on the means of achieving maximum structural efficiency in integral forms of construction following considerations of material distribution throughout the body cross section, so that the minimum is used without undue stresses arising in individual sections. Whereas the strength-to-weight ratio is often a suitable yardstick for steel designs the stiffness-to-weight ratio is considered of greater importance in designs to be built of aluminium alloy.

Rarely is it possible to make full use of the available strength of aluminium alloys because of difficulties in restraining deflection within reasonable limits. In the search for a greater load-to-tear ratio, and with the consequent tendency to reduce safety factors, fatigue strength begins to loom as one of the prime mechanical properties to be observed in aluminium. This is because fatigue failure can occur without revealing plastic deformation even in the more ductile alloys and often in areas nominally stressed well within the accepted elastic range.

As the search progresses for more efficient structural designs using less material to perform the same and sometimes more arduous duties than previously, so will the designer have to rely to a greater degree on mathematical justification of a structure up to the time of building a prototype, and on strain-gauging and other modern testing facilities at the time of building.

During recent years there has been an increasing appreciation of the scope afforded by both the extrusion process and the range of alloys available. Although the majority of designs has continued to develop to suit riveted construction which results in rather high building costs, increased deflection, and some weight penalty, there is every indication that welding will play an increasing part in the fabrication of future aluminium-alloy rail-vehicles. One of the most marked improvements achieved by welding is the continuity of structure possible in the body cross-section especially in the region of the solebar, and the better distribution of load-carrying members around the periphery permitting an approach towards a tubular body.

Answering questions on a paper, "Stress Determination in Coach Frames by Electronic Computation," by Professor D. N. de G. Allen and Mr. D. W. Windle, the former gave as an example of the cost of computer calculations the figure of £3 for the solution of 135 equations in only six-and-a-half minutes. This applied to the assessment of the distribution of stress in an idealised frame by the relaxation method in which it is more usual to work out two-dimensional problems first (i.e. dealing with sides and floor and roof separately) before going on with three-dimensional calculations. Matrix algebra is also used to solve the same kind of problem but Mr. K. P. Brockway pointed out that with the force-matrix method there should be no need to idealise the frame structure—with this even the roof members can be put in as quantities and valuable material saved where otherwise there would be waste and excessive weight.

The symposium gave a welcome opportunity for pooling ideas resulting from much practical experience with the construction and use of aluminium rail vehicles in Britain, Canada, France, East Africa, Germany, and the United States. Opinions expressed in the papers from oversea contributors varied from caution to enthusiasm; all of them merit close attention and we will discuss the facts presented in as much

detail as possible in future issues. Elsewhere in this issue there is a summary of the proceedings and also recorded is the luncheon given on the same day by the Aluminium Development Association at which the principal guest was Dr. Reginald Bennett, Chairman of the Parliamentary & Scientific Committee.

Long-welded Rails on British Railways

IN the vital attempt to make British Railways self-supporting, one of the principal aims is the reduction of civil engineering maintenance costs, provided that safety, passenger-comfort and efficiency are not sacrificed in its attainment. Too little has been published to describe the comprehensive measures already taken towards this end, due in no small measure to British engineers' innate dislike of publicity. In point of fact their methods of construction and maintenance are thoroughly up-to-date and they are amply equipped with all the latest means of scientific investigation and labour-saving mechanisation to meet the challenge.

One of the most important measures taken has been the use of long-welded rails, but it was adopted only after thorough investigations had assured its safety. These took the form of both field and laboratory tests to make sure that buckling could be prevented. Because of their utmost importance, it is regrettable that the tests cannot here be described. Suffice it to say that only the end lengths (each of about 100 yd.) in each long-welded rail moved longitudinally due to thermal stresses within the maximum range of temperature, 8° to 128°F.; various types of rails, sleepers, ballast, fastenings, sleeper-spacings, degree and amount of ballasting and tightness of fastenings were used for testing. Both lateral and longitudinal ballast resistance as well as torsional and creep resistance were investigated. As a result of these tests, extending over a period of about five years, a formula has been derived to predict the buckling load of any type of track under any conditions. Other studies showed that financial savings are assured if long-welded rails are used.

It had to be realised that, as compared with those in many other countries, British Railways were handicapped in the adoption of this new policy. Severely-restricted loading-gauge and narrow formation widths on many lines limited the generous depth and width of ballast necessary to ensure the vital stability of long-welded track. Intensive train services in so many parts of this island complicated the attainment of that perfection of alignment and sleeper-packing essential with this type of track. Also for some years after the war overdue maintenance and shortage of labour dictated the retention of the 60-ft. rail-length with pre-assembled mechanised track-laying methods. Nevertheless, investigations into the practical and economical possibilities of the long-welded rail went ahead, though they were complicated by such developments as the change over to the flat-bottom rail, necessity for formation strengthening, widespread ballasting, and the application of payment by results based on work-study techniques.

When the modernisation plan was launched in 1955 it appeared certain that ultimately some measure of financial advantage might be attained if long-welded rails were used on many sections of the system and especially on important fast-running lines. With its many other obvious advantages this policy was therefore included in the plan.

Investigations also proved that the most suitable type of sleeper for use with long-welded rails was of concrete as opposed to timber. For though it costs more initially and has a negligible credit value on ultimate recovery, it has greater longevity and stability and is cheaper to maintain at the same number of sleepers per mile as timber. Accordingly, a pre-stressed concrete sleeper has now been standardised for use with long-welded rails. It is 8 ft. 6 in. long, has a uniform bottom width of 10⅜ in., and a depth of 6 in. at each end rising to 8 in. under the centre of each rail and tapering down again to 5½ in. throughout the middle 2 ft. of the length. As the sides taper inwards and upwards, the top width varies from 8⅝ in. at the rail-seat to 9 1/16 in. at the centre. The sleeper is cast to provide the standard rail-cant. Three rows of pre-stressing wires 0·2 in. in dia. (indented) are provided, there being 26 wires in all.

To meet the requirements of long-welded track four new British Railways flash-butt welding depots have been added to the two B.R. and one London Transport depot previously in use. At each depot the production line is fully mechanised, many of the machines being specially-designed prototypes. Planned annual output at a typical depot is 80 track miles of new long-welded rails with 10 men working single shift. All types of flat-bottom and bull-head rails can be welded by a simple adjustment of the machines.

The rails arriving from the rolling mills are first fed into a straightening machine to make their ends perfectly true. They are then either stacked for storage or passed on to a cleaning machine for the removal of rust and scale. The rails are fed " in tandem," the trailing end of one rail and the leading end of the following one being automatically wire-brush cleaned simultaneously in about 4 min. Next they move on in turn to an A.I. welding machine, a stripper, two profile grinders and a final straightening machine, all housed in one long shop. The last two machines are adjustable to suit different rail-lengths, being mounted on wheels running on railway tracks; the normal setting is for 60-ft. rails. All machine operations are based on a 6-min. cycle. A welding recorder attached to the welding machine charts a permanent record of the characteristics of each weld and provides a check that the machine is operating efficiently.

For carriage to site trains consisting of 12 rail wagons are loaded with 22 rails, each, say, 720 ft. in length, in two tiers of 12 and 10 rails. The loading is done by 12 winches on each side of the loading dock, operated either singly or in pairs. From the older depots rail-lengths of 300 ft. are despatched, but from the newer ones 900 ft. lengths can be dealt with. The rails are pulled off the end wagon at site and guided down on to their final resting places on the baseplates.

For double-line occupations relaying machines can now handle 60 ft. lengths of concrete sleepers assembled temporarily with serviceable rails. After the sleepers have thus been placed in their final places in the track the temporary rails are replaced by the long-welded type. For single-line occupations a special type of twin portable gantries is being developed to place the sleepers and their temporary rails in the road. The gantries span the track being relaid but travel on the long-welded rails, for the time being laid widely-spaced and clear of the sleeper-ends.

The long-welded rails as delivered from the flash-butt welding depots are welded up at site by one of two processes to form longer continuous lengths. The earlier Thermit process is now being replaced by what is known as the Quick Thermit process. In it the pre-heating process has been reduced to 3½–4 min., and pre-fabricated moulds further expedite work in the track, enabling a pair of welds to be made and ground to profile in about 30 min. The other method is the Philips Metallic Arc Weld Process which has proved after thorough field and laboratory tests to stand up well to all demands.

Although the fastenings used with long-welded rails have proved capable of preventing creep due to temperature changes, British Railways lay adjustment switches on timber sleepers at the ends of continuous welded lengths. These enable rail de-stressing to be carried out when continuous lengths have had to be laid at abnormally high or low temperatures and need to be normalised subsequently at moderate temperatures, 55°-75° F.

Meanwhile, to economise manpower new types of track-work machines are being acquired almost daily. Those in use include the Morris Track–Layer train, the twin-crane track layer, the elaborate ballast cleaner, the ballast plough, the ballast-packer and many types of pneumatic and electric-smaller machines. On- and off-rail transport of men and materials is also being expedited by the use of motor vehicles, all assisting in economical modernisation.

East African Railways & Harbours in 1959

THE report on East African Railways & Harbours for the year 1959, a copy of which we have received from Sir James Farquharson, the Acting Commissioner for Transport and General Manager, is, as was last year's report, an attractively produced publication, with informative graphs and photographic illustrations of topical interest. In presenting it to the Chairman of the East African High Commission, Sir James Farquharson states that the financial position of the E.A.R. & H. improved during 1959 and that it should be possible to maintain this, provided the level of traffic is maintained and expenditure is firmly controlled.

Goods traffic over the railway system in 1959 showed an

increase over 1958. This was mainly because of a rise in the tonnage of the principal commodities exported, together with a smaller growth in internal movement. Import tonnages, except for oil products, were slightly below the 1958 figure. Traffic movement on the Kenya-Uganda and Tanga Lines was above that of 1958 during the first half of the year but thereafter dropped to a similar level. On the Tanganyika Central Line activity increased in the second quarter of the year and afterwards remained fairly consistently above the 1958 level.

The tonnage originating was 4,070,000 or 4 per cent more than in 1958. The increase in public ton mileage from 1,517 million to 1,585 million was also 4 per cent. Like the 1958 figure this was a record for the East African Railways. The number of livestock carried showed a substantial increase of 18 per cent from 369,000 head in 1958 to 437,000 head in 1959.

Goods traffic on the Lake Services increased by 4 per cent from 357,000 to 370,000 tons. There was a fall in traffic on Lake Kioga from 71,000 to 61,000 tons, but traffic on Lake Albert and the West Nile increased from 32,000 to 36,000 tons, mainly because of a better cotton crop. Traffic on Lake Tanganyika amounted to 8,000 tons, a slight improvement over 1958, arising from the new traffic in bulk oils carried between Kigoma and Mpulungu for Northern Rhodesia. On Lake Victoria the tonnage carried at 265,000 was again a record, being 19,000 tons higher than in 1958.

Passenger journey totals were slightly lower than in 1958. The cause of the decrease was a reduction in third class travel on the Kenya-Uganda and Tanga Lines, where bus operations have spread fairly rapidly in recent years. Passengers fell from 6,218,000 to 6,131,000, a decrease of 1.4 per cent. First class passenger journeys at 91,000 were 7,000 more than in 1958, and second class journeys, at 194,000, were 1,000 higher, the whole of the decrease therefore occurring in third class travel which fell from 5,941,000 to 5,846,000 passenger journeys.

The number of passengers carried on the Inland Waterways services fell from 702,200 to 701,000. The Lake Kioga services are now facing strong road competition for passenger traffic moving to and from the West Nile via Masindi and Butiaba.

Growth in revenue showed a tendency to lag behind growth of traffic because of rate adjustments dictated by competition, and as a result the holding of working expenditure at a level slightly below that of the previous two years was a factor of major importance in the overall results. Railway revenue at £19,514,000 was £585,000, or 3.09 per cent, more than the previous year, but the proportion accounted for by traffic in the higher rated classes continued to decline because of the reductions necessary in the higher rates to counteract competition. Harbours revenue increased by £162,000, or 3.60 per cent, to £4,671,000, mainly because of increased exports.

Ordinary working expenditure on railway account was some £47,000 less than in 1958, a figure which represents no small achievement when taken in relation to the increased public traffic. Factors contributing to the saving were staff economics, lower prices for furnace oil for steam locomotives, and a lower actual consumption per mile. The tonnage of materials moved on departmental account was also sharply reduced, and prices of materials used by the E.A.R. & H. remained generally either steady or very slightly lower.

Ordinary working expenditure on Harbours Account was £13,000 less than for 1958, in spite of an increase in the cost of cargo handling.

Some of the principal results for 1958 and 1959 were as follow:

	1958	1959
	Thousands	
Railways, steamers & motor transport :—		
Total train-mileage	9,342	9,902
Passenger journeys	6,218	6,131
Goods tonnage	3,902	4,070
	£ thousands	
Coaching receipts	2,147	2,149
Goods receipts	14,749	15,260
Total receipts	18,930	19,514
Working expenses	13,957	13,910
Harbours:—		
Receipts	4,509	4,671
Expenditure	3,728	3,708

The number of staff directly employed at the end of 1959 was 51,519 consisting of 45,277 Africans, 4,628 Asians, 1,614 Europeans. The total cost of salaries and wages (including house allowance paid in cash, but excluding other allowances, housing medical, passages and pension fund costs) for all staff directly employed was £8,709,540 (£7,697,065 Railways and £1,012,475 Harbours), an increase of £165,099.

In Uganda work started in July on a 46-mile direct railway between Bukonte and Jinja, which will shorten the rail distance between Tororo and Jinja and points west by some 45 miles. It is planned to open the line for traffic during the first half of 1961.

In Tanganyika work began in January on the 46½-mile branch line from Kilosa, on the Central Line, to Mikumi on the Morogoro-Iringa road. It is scheduled for completion by mid-1960. An Industrial Area at Mikumi was planned in conjunction with the Tanganyika Government and will be provided in 1960.

The remodelling of the Kampala Locomotive and Marshalling Yard was completed with the erection of a new locomotive shed and the installation of a 5,000-ton fuel oil storage tank and oil decanting siding. At Jinja a new goods shed was brought into use early in the year. A start was made during December on the sidings at Kahawa which will serve the Military Cantonment. At Mombasa Station improvements were made to the booking office, parcels office and station entrance and the platform canopy was extended.

On Lake Victoria good progress was made with the construction of the new port at Mwanza South. Bulk oil handling facilities were provided at Kisumu and Musoma, and on Lake Albert work continued on the rehabilitation of Butiaba Pier.

There was a revival of interest in rail-served industrial plots. Generally in Uganda and Tanganyika the management of rail-served industrial estates is a responsibility of the Government Land Departments but in Kenya the E.A.R. & H. manage such estates, in some cases on their own behalf and in some cases on behalf of the Government.

During 1959 major land transactions included the sale of approximately 260 acres to a petroleum company at Changamwe, Mombasa, and the acquisition of large areas of land for the new railway lines between Jinja and Bukonte and between Kilosa and Mikumi.

Progress in Southern India

THE Southern Railway of India, on its formation in 1951 from the Madras & Southern Mahratta, South Indian, and Mysore State Railways, was faced with problems of accumulation of arrears of maintenance combined with a public need for increased transportation. The first Five-Year Plan (1951–52 to 1955–56) was devoted to rehabilitation of assets. Mr. S. N. Barua, Senior Deputy General Manager of the railway, has described the improvements carried out on the Southern Railway under the First and Second Plans.

The route-mileage in 1951 was 6,000, which has been increased by new construction to 6,161, consisting of 1,858 miles of broad, 4,207 miles of metre, and 96 miles of narrow gauge. Two-thirds of the traffic is moved on the broad gauge. The situation of the railway, remote from coalfields and the larger industrial centres, has not been favourable for traffic. In general, the flow of loaded wagons is from north to south, with northward flows of empties. Traffic from the North is received *via* the broad gauge junction points at Waltair, Vijayawada (Bezwada), and Raichur. The main problem continues to be acceptance of more and more loaded traffic through these junctions. The impact of increased traffic was heavy on the Madras-Vijayawada sections as two streams of traffic from the north merge at Vijayawada. The many works to increase line capacity on the Madras-Vijayawada section included extension of loops at 50 stations to hold 80 wagons to enable longer goods trains to be run and provision of additional loops at 17 stations. They were completed during the First Five-Year Plan. Two major items of work, conversion of the Renigunta-Gudur section from metre to broad gauge and construction of the metre-gauge link from Ernakulam to Quilon were completed during the first two years of the Second Plan period. Diversion of a portion of the north-to-south traffic *via* Gudur and Renigunta will relieve Tondiarpet Marshalling Yard (Madras) which is already working under very heavy pressure. The Ernakulam-Quilon link has opened up the rich hinterland of the Kerala State and affords additional facilities for export through the port of Cochin.

A change in the pattern of import traffic affected movement in 1951–55, but since then net ton-miles have increased by 18·4 per cent during the first three years of the Second Plan period compared with 1955–56, the last year of the First Plan period, and there are indications that this trend will continue;

in the Second Plan the aim was to provide for the steadily increasing traffic. It has been decided to double 209 miles, including the sections Tenali-Gudur (93 miles); Rajahmundry-Samalkot (31), Arkonam-Jalarpet (57), and Arkonam-Renigunta (23 miles). Seventy-two miles of double line have been opened for traffic and 83 miles more are expected to have been completed by next October. The programme provides for interlocking of 102 non-interlocked stations and raising the standard of signalling from Standard I to Standard III at 54 stations.

Conversion of the Gudivada-Dharmavaram section from metre to broad gauge has been started. At Madras Central Station the volume of traffic has outgrown the facilities and re-modelling is an urgent problem. The scheme provides for carriage sidings, including washing plant, at Basin Bridge, near the terminus, quadrupling between Basin Bridge and Madras Central, power signalling, and 11 platforms at Central each able to accommodate 15 bogie coaches.

A workshop for manufacturing signalling materials at Podanur has gone into production. Various types of signalling equipment are made. When the workshop attains full capacity, it is expected that there will be an annual saving of Rs. 25 lakhs a year in foreign exchange. A creosoting plant has been installed at Olavakkot for treating low-grade timber sleepers available on the West Coast. The plant has attained its capacity for treating 30,000 broad-gauge sleepers a year. Extension of electrification from Madras to Villupuram has been sanctioned and the civil engineering work is progressing.

Apart from the flow of goods traffic from north to south, which is bound to increase further when the steel plants go into full production, there is greater demand for transportation in the areas served by the Southern Railway because of increased movement of iron ore to ports for export, the lignite project at Neyveli, the construction of the Nagarjunasagar Dam and setting up of several medium-sized and small industries such as cement, motorcars, textiles, and so on. Further increase in traffic may be expected with the industrial development of the Salem area. The development of iron ore traffic, particularly in Mysore State, has been considerable in the last 4—5 years. Line capacity is being increased by means of new crossing stations, longer loops, and so that the railway will be fully prepared to handle this traffic.

A Fresh Setback to American Railways

(By a correspondent)

AFTER a disappointing experience in 1959, American railroads were confident that freight traffic might improve by 8 per cent in 1960. Actually in 14 weeks to April 9 wagon loadings were 1,040 less than in 1959, though 633,700, or 8 per cent, above the dismal year 1958. The belief that when the steel industry resumed work it would lead the way to record business activity was refuted. More ore, coal and coke were carried, but an increase of 24,000 in wagon loadings of general merchandise was less than one per cent above last year and the only other traffic to improve was forest products, which filled 12,000, or 2 per cent, additional wagons.

On the other side of the account grain loadings decreased by 56,600, nearly 8 per cent; livestock occupied 7,160, or 11 per cent, fewer wagons; the persistent fall in less-than-wagon load traffic reduced this year's loadings by 63,684, or 11 per cent. Since 1948 rail conveyance of "smalls"—quantities under five tons—dropped from 5,457,000 loaded wagons to 2,115,000 last year. This decline of 61 per cent may mean that at an early date freight trains will be hauling full wagon loads exclusively. Incentive rates are quoted freely to induce traders to load wagons as closely as possible to capacity. These rates not only secure competitive traffic, but reduce rail costs and ease pressure on wagon stock. The last point is important as on April 1 the railroads had 17,000 fewer serviceable wagons in traffic than a year ago.

To some extent arrangements made by at least 50 railroads to carry loaded road trailers on flat wagons may have offset the loss of "smalls." For the week ended April 2 loadings of road vehicles reached the record number of 11,280 and for 14 weeks to April 9 numbered nearly 145,000, 45 per cent more than in the same period of 1959. It is too early to estimate the value of this new traffic, which as yet accounts for merely one per cent of all wagon loadings. Substantial sums have been spent on flat wagons, with special fittings, and on facilities for handling road trailers at terminal points, but the net revenue earned by the railroads participating in the scheme is not known.

For the months of January and February, railway freight revenue rose by $28·5 million (2·2 per cent) to $1,326 million. Passenger revenue decreased by $907,470 (0·8 per cent) to $106 million. Operating expenses were $765,800 higher at $1,255 million. The railroads held the operating ratio down to 80·2 per cent, but the burden of taxation laid upon them was heavier by $15 million, or nearly 10 per cent. Amendments to the acts concerning railroad retirement benefits and unemployment insurance will cost the railroads over $100 million a year in additional payroll taxes. Debits for equipment and joint facility rents were also over 10 per cent higher. At the end of February the railroads were left with earnings, before charges, of $85·7 million. These earnings have decreased, year after year, from $1,128 million in 1955 to $749 million in 1959, a fall of one-third, and an increase of $10 million in the first two months of this year is, as things stand, by no means a sure sign of an upturn in earnings over the whole 12 months.

Letters to the Editor

(The Editor is not responsible for opinions of correspondents)

Stafford Station

May 25

SIR,—The article in your May 20 issue on the reconstruction of Stafford station states that the present buildings were erected in 1850. This is incorrect. The present station, built at a cost of £28,000 by Mr. John Parnell, of Rugby, was completed in March, 1862. The materials of the 1847 station, which it replaced, were sold by auction on April 24, 1862.

Yours faithfully,

C. R. CLINKER

9, Regent Place, Rugby

Summer Timetables

May 27

SIR,—Once again we are coming to the closing stages of British Railways' annual sporting event, the great summer timetable publication race. As a foregone conclusion it has been won handsomely by the Southern Region, and the wooden spoon goes to augment the vast collection at Euston. One appreciates that the London Midland Region is in the travails of modernisation, but management must have sunk to a low ebb if it does not know what train service it is going to operate in a fortnight's time—and this has happened every year.

Enquiries at several railway offices about the publication date of the L.M. Region timetable have been met with open scorn of Euston's performance in publication and the assurance that when the timetable did come, it would start life with a 100-page supplement of corrections. I cannot do better than pass on to Mr. David Blee, General Manager of the Region, the suggestion made in one enquiry office (in the Western Region!) that the Euston timetable clerks should first go on a course at Waterloo and should then speak for the first time to their London Midland Region colleagues responsible for running the trains.

If one Region can organise its very considerable summer service alterations in time to have them in the hands of the holiday-planning public in March, what is the trouble at Euston ?

I should also like to know why British summer services cannot start on the same day as those on the Continent. The present arrangement just misses Whitsun and involves a great deal of extra train working at weekends in early June which is almost a summer service but is not advertised except on a local hand-to-mouth basis.

Yours faithfully,

R. K. KIRKLAND

70, Westfield Road, Surbiton

[Late publication of timetables is the subject of editorial comment on page 642.—ED., *R.G.*]

THE SCRAP HEAP

Narrow-Gauge Working in Suffolk

The track of the 3-ft. gauge Southwold Railway, which ran for nine miles between Halesworth, on the East Suffolk Line of the former Great Eastern Railway, and Southwold, has been removed, and few traces of the railway remain. The line was opened in 1879, and closed in April, 1929. The illustration shows a train from Halesworth entering Blythburgh Station in August, 1923, with the staff about to be exchanged. The 2-4-0 locomotive, No. 3, *Blyth*, was built by Sharp Stewart in 1879 and re-built in 1900.

Photo] [*G. E. Buncombe*

Southwold Railway train, hauled by 2-4-0 locomotive "Blyth," entering Blythburgh Station in August, 1923

Ebb Tide

The severe fall which has taken place of late in all the leading Home Railway stocks will not surprise the readers of this journal. We have drawn attention for months past to the decline in railway profits and the inevitable fall in prices and dividends which was to be expected in consequence. The railways must take the fat with the lean. They have had a splendid time for the last few years, and they will have to make the best of the dull times which appear to be before them.—*From the "Financial Times" of May* 7, 1900.

Trees by the Line?

Those living in Hertfordshire, and doubtless elsewhere, have noticed with alarm and disgust the squalid and untidy appearance of the railway embankments, cuttings, and tracks. To this depressing sight are now added, in increasing numbers, the untidy and dirty back premises of numerous factories close to the line. Is this really necessary? Could not the Minister of Transport, whose interest in fares should be considerable, do something to improve the impression that rail travellers receive from the abominations described? Could not the Forestry Commission advise on planting beside the track, to improve the general appearance and screen some of the factory yards from view? The steam locomotive is on the way out, so that the fire hazard from sparks is rapidly diminishing.—*From a letter to "Country Life."*

Weather Changes Affect Drivers

Changes in climatic fronts and air pressure, air streams and humidity all affect the driving ability of tired or sick drivers, according to a report on the work of the Hungarian State Railways Neurophysiological Institute, published in the newspaper *Nepszava*. Last year the Institute tested the reflexes and vision of 30,000 applicants for road driving jobs with the railways, and made a thorough study of the influence of weather changes on driving ability. Figures issued by the Institute show that 34 per cent of all road accidents in Hungary take place at a time of climatic front changes.

A Picasso Under the Parcels?

The railway companies were not backward in calling the traveller's attention to the resorts their lines served, the scenic splendours to be viewed on the way, and the hotels they had built for his residence. . . . But these, with the exception of the map, were depicted by photographs and in sepia at that, never a splash of colour to beguile the eye of the beholder. . . . Enlightened managements over the years have changed all that. Today not all who travel by train are as aesthetically sluggish as the conditioned commuter. . . . The bulkhead beneath the parcel rack is, on the evidence of the railway authorities themselves, of great commercial value for it is seen by millions of travellers each week. Who knows what changes in public taste might not be wrought if from time to time a few Old Master prints or examples of the work of living artists were to be displayed?—*From "The Times."*

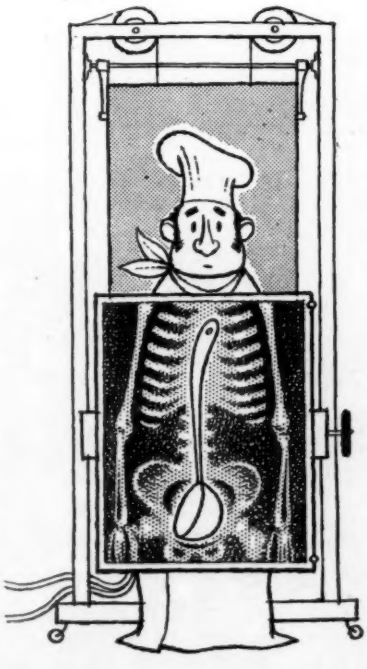
Spécialité de la Maison

Other Notes on Hygiene

The common house fly and the bluebottle (blow fly) will lay eggs on unprotected food, particularly meat.

Every effort must be made to keep flies out of kitchens, galleys and other rooms in which food is prepared or stored.

This is of particular importance in foreign ports.



Two illustrations of the Southern Region's "Food Hygiene" (see editorial reference this week)

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

SOUTH AFRICA

New Rolling Stock in Service

Sixteen new electric and 13 diesel-electric locomotives were placed in service by the South African Railways during the first three months of the present year. In addition, 51 passenger vehicles, built by the Union Carriage & Wagon Company in South Africa, were added to the establishment. During the same period, 1,671 goods wagons of various descriptions and 10 guards' vans were also placed in service. Included in the goods stock were 65 tank-wagons, 135 short fruit wagons and four steam-heater wagons for electric passenger trains.

Reduction in Claims

The first nine months of the 1959-60 financial year saw a marked decrease in claims against the railways for losses as a result of pilferage, thefts and other shortages. Claims paid out in respect of pilferage and theft dropped by 25·2 per cent in comparison with the first nine months of the 1958-59 financial year; payments to cover other shortages dropped by 26·2 per cent and there was a decline of 35 per cent in payments arising from delays for which the railways were responsible. During the period April 1, to December 31, 1959, 7,211 claims were paid in respect of pilferage and theft in comparison with 8,656 during the corresponding period of last year; 1,445 fewer claims or a decline of 16·7 per cent.

EAST AFRICA

Uganda Rail Link

A sum of £550,000 has been approved by the Uganda Central Legislative Assembly for a new rail link between Soroti and Lira. Under the scheme the Uganda Government will raise £440,000, and the Railway Administration the other £110,000. The Uganda Government is also required to guarantee any operating losses which the new line may incur.

NEW ZEALAND

Auckland-Wellington Daylight Express

Mr. M. Moohan, the Minister of Railways, has stated that the introduction of fast daylight express train services between Auckland and Wellington is being confidently studied. Following the recent successful trial run of a light express train from Wellington to Auckland and back, investigations are being pushed ahead as quickly as possible. An officer of the Railways Department, expert in diesel motive power, was now overseas examining the latest developments in diesel locomotive and passenger train equipment, he said. During May, the Department's chief mechanical engineer, chief civil engineer, and transportation superintendent would be attending a conference in Australia and would take the opportunity to obtain first-hand information about the attractive lightweight passenger coaches now being made and used in that country. In addition, they would study all aspects of railway equipment to enable New Zealand Railways to offer the highest standard of fast, comfortable rail travel between Wellington and Auckland.

WESTERN AUSTRALIA

Half-boom Gates in Perth

To facilitate the flow of traffic and to provide greater access to and from the city of Perth, the Government Railways has installed two automatic half-boom gates on the level crossings at Moore and Lord Streets. These crossings are situated within ¾ mile east of Perth over the three lines serving the Eastern and South Western main lines and an independent main line to East Perth also used for the exchange of motive power between Perth and the locomotive depot at East Perth.

To install automatic half-boom gates at these points, it was necessary to convert the signalling system between Perth and East Perth from manual to automatic operation. This entailed the complete rewiring of the terminal signal cabin at Perth, the removal of signal cabins at both Lord and Moore Streets and the provision of four relay cabins.

A 20 sec. warning is given to road traffic, and time delays have been incorporated to ensure that when trains are halted at signals this warning time is maintained. In the event of electrical failures emergency circuits permit the manual operation of the half boom gates. Electrical switch locks have been installed for the shunting of two private sidings off both main lines.

The principal items of equipment were supplied by McKenzie & Holland Pty. Ltd., of Melbourne, Metropolitan-Vickers-G.R.S. Limited, now incorporated in the A.E.I. Group., and the Western Railroad Supply Company, U.S.A. The installation was completely designed and carried out by W.A.G.R. Engineers and staff.

Half-boom gate installation at the Lord Street level crossing, Perth

CANADA

Reduced Summer Fares

Two new incentive fare plans designed to attract summer travellers to the railway have been announced by Canadian National Railways. One plan provides for a reduced all-inclusive fare for individuals on trans-continental trains between Eastern Canada and Western Canada and between major points in the West. A single price includes ticket, sleeping car accommodation, meals, and tips. The second plan offers group economy fares for coach travel for two or more people travelling together on a return basis for trips of 72 miles or more, anywhere in Canada. This is the first time plans of this type have been offered during a peak travel period.

UNITED STATES

Fast Daily Freight Service

On April 20 the New York Central administration inaugurated the "Super-Vans" service between New York and Chicago covering the 960 miles at what is practically passenger-train speed. It is the fastest daily freight service ever introduced between those cities; slightly under 24 hr. westbound and a little over 24 hr. eastbound. Each train consists entirely of "Flexi-Van" vehicles. The "Flexi-Van" is a bogie flat-wagon with a turntable through-truss-span superstructure capable of privoting round at right angles to the track for loading and

unloading. There are two decks, one on the bottom and the other on the top chord of the span, and each will accommodate two of the longest American motorcars.

According to a Vice-President of the railway the " Super-Van " express freight service is the result of a phenomenal demand for " Flexi-Van " service amounting to nearly 3,000 a month. These vehicles are now also included in the New York–St. Louis daily fast freights. " Flexi-Van " rates between Detroit and New York are from $10 to $25 cheaper than by other methods of carriage.

Double-deck Chicago Suburban Stock

The main-line railways providing suburban services in and around Chicago are making a determined effort to improve those services, mainly by modernising their carriage stock. A sum of well over £1,000,000 is being spent by them collectively to acquire this equipment. The Chicago & North Western, the largest commuter carrier, is placing in service no fewer than 116 new double-deck push-and-pull coaches at a cost of about £750,000. Similarly the Chicago, Milwaukee, St. Paul & Pacific administration has framed a three-year programme to replace all its conventional suburban stock with 75 double-deck coaches at a cost of £469,000. The Chicago, Burlington & Quincy Railroad already owns no fewer than 60 double-deck coaches, which like its 88 single-deck units are all air-conditioned; it is likely to increase its double-deck stock. A request has also been lodged for permission to increase fares.

CHINA

Construction of New Lines

Some 5,000 miles of new railway were built during 1959, including double-tracking. Much of this mileage was in feeder lines to mines and factories, many of them of considerable length. Many of these feeder lines were built by local Governments.

Progress is being made on the railway to Llasa through Chinghai Province. This is open to traffic as far as Sining, 100 miles. Tracklaying is reported to have reached the borders of Chinghai Province last August.

The first 80 miles of the Hunan-Kweichow railway has been opened to traffic.

Acceleration of Passenger Services

Long-distance passenger services are being accelerated. The latest case is that of the through Peking–Canton trains which now cover a distance of 1,400 miles in an overall time of 43 hr. 48 min. at an average running speed of 40–45 m.p.h. The run from Peking to Canton is the longest regular daily journey in a North to South direction anywhere in the world, and covers the widest variety of temperatures and climates.

ARGENTINA

Privately-owned Talgo Trains

A revolutionary scheme for the introduction into Argentina of privately-owned Talgo type trains has been submitted to the Minister of Public Works & Services by the promotors of Trenes Expresos Argentinos, a new company to be formed with a capital of 1,000 million pesos, contributed by agricultural, livestock, industrial, and other interests. The rolling stock, of a type similar to that used in Spain, the U.S.A., Germany and Sweden, would be owned by the new company, which would pay the State Railways the corresponding dues or rental for the use of its installations. Passenger trains would run non-stop at 62 m.p.h. for a minimum distance of 310 miles, and goods trains at 37 m.p.h.

The introduction of Talgo trains to Argentina has already been studied, trials having been made in the Province of Cordoba as recorded in our issue of October 7, 1955.

Proposed New Branch Line

A proposal has been put forward for the construction of a new broad-gauge branch of the General Mitre Railway from Colonia Dora to Añatuya (General Belgrano Railway) with the object of facilitating goods traffic from the North-Western Provinces to Buenos Aires, taking advantage of the better services and wagon availability of the former system.

Publications Received

L'Année Ferroviaire, 1960.—Paris 6e.: Librairie Plon, 8, Rue Garancière. 9 in. x 5¾ in. 274 pp. Illustrated wih photographs, maps, and diagrams. No price stated. The 14th of these annuals is divided into two parts, as in previous years. The articles in the first part include a succinct but comprehensive study of Channel Tunnel projects by Monsieur R. Hutter, Directeur des Etudes Générales, French National Railways, who outlines clearly the problem of motorcar and other traffic which would be moved by rail. Monsieur G. Ramé, Chef Adjoint de la Direction du Mouvement, discusses the problem of long-distance passenger traffic with special reference to the Paris termini. The facilities offered by the S.N.C.F. for conveyance of motorcars and motorists, and the S.N.C.F. car-hire system and garages at stations are described by Monsieur A. Barbaut, Ingénieur en chef à la Direction Commerciale. Monsieur J. Walter, Ingénieur en chef à la Direction des Installations Fixes, contributes an article on teleprinters. The second part consists of a statistical review of the S.N.C.F. in 1958, and some of the world's principal railways, with chapters on technical developments in France. The information on the S.N.C.F. is very well presented, more especially the brief accounts of developments in traffic, including wagon turnround and *couchettes* for night travel. A chapter on motive power includes some useful graphs, and there is much of interest in its short sections devoted to electric and diesel traction. " Installations fixes " is the title of a brief chapter dealing with way and works, signalling, electrification equipment, and production of electric power on the S.N.C.F. This part of the book is of considerable value for reference.

The Widening Circle, Warner & Swasey.—Machine tools manufactured by the Warner & Swasey Company of Cleveland, Ohio, are described briefly in this illustrated leaflet published to show, in condensed form, the entire range available. This includes turret lathes controlled automatically by the Electro-Cycle principle, ram-type turret lathes designed for economical production of small-lot work, saddle-type turret lathes, and single- and multi-spindle bar automatics. There is a quick-reference table of leading dimensions and data. Single-spindle chucking automatics also described include the model 2AC now being built in Halifax by Warner Swasey Asquith Limited. Copies may be obtained from Drummond - Asquith Limited, King Edward House, New Street, Birmingham, 2.

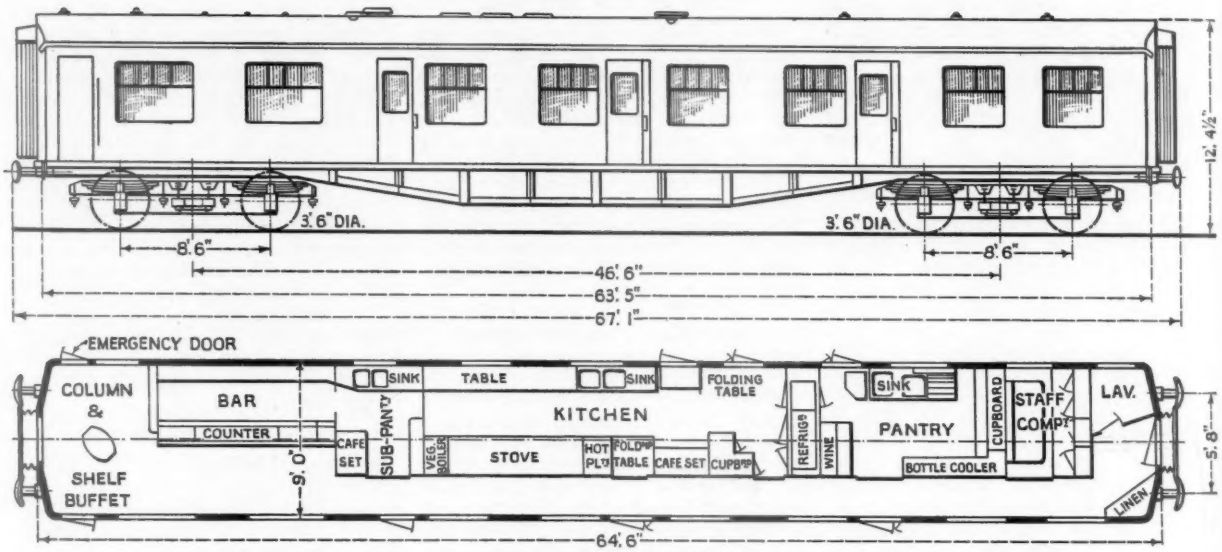
Holdtite Industrial Adhesives.—The ninth edition of this catalogue describes a wide range of adhesives for railway upholstery work and special applications such as the fixing of materials for heat and sound insulation and actual constructional work in wood and metal where great bond-strength is essential. Typical uses are illustrated and technical data is shown for each grade. A recommendation table summarises the adhesives available under classified industrial headings. Copies may be obtained from Surridge's Patents Limited, Croydon Road, Beckenham, Kent.

The Geon Story, Everyman's Guide to P.V.C. Plastics.—Geon polyvinyl chloride made basically from coal, limestone, water, salt, and oil and produced in the form of fine white powders (resins), milk-like fluids (latices), or coloured granules prepared ready for use (compounds), is processed into a number of characteristic secondary forms. Details of the primary raw materials and secondary forms, the methods of processing, including calendering, extruding, and blowing, and typical products and their uses are all explained in this 44-page illustrated guide obtainable from British Geon Limited, Devonshire House, Piccadilly, London, W.1.

Sifbronze Oxy-Acetylene Welding Products.—To replace the 1957 edition this specifications list gives full technical details of all the 34 different rods and 18 types of flux which constitute the Sifbronze oxy-acetylene welding range together with ancillary equipment including blowpipes, cutting machines, regulators, and goggles. Particulars given include the type of work for which each rod and flux are designed, and methods of use. Appearing for the first time in the booklet are full details of the new rods, Sifbronze 101 and flux-coated Sifbronze 104. Copies may be obtained from Suffolk Iron Foundry (1920) Limited, Stowmarket, Suffolk.

Kitchen Buffet Cars for British Railways

Alternative attractive décor in patterned plastic finishes for standing buffet service. Double-glazed windows



Side and plan elevations of the new kitchen buffet cars, showing principal dimensions and general layout

THE first batch of a British Railways order for 53 kitchen buffet cars has recently been delivered by Cravens Limited of Sheffield.

The allocation of the complete order comprises 31 cars to the London Midland Region, 20 cars to the Eastern and North Eastern Region, and two to the Southern Region.

These cars, which are required for services on which there is a substantial demand for both light refreshments and full meals, have been designed to British Transport Commission requirements under the general direction of Mr. J. F. Harrison, Chief Mechanical Engineer, British Transport Commision, and Mr. E. K. Portman-Dixon, Chief of Restaurant Cars & Refreshment Rooms, British Transport Hotels & Catering Services.

The layout of the car body is in three main sections, with the combined bar and buffet at one end, kitchen and pantry in the centre, and staff quarters at the other end.

Two schemes of interior décor, for which Sir Hugh Casson was the design consultant, have been used, both of which provide a pleasing and attractive finish throughout.

Patterned Plastic Finishes

For 28 of the cars the buffet compartment walls, partitions, and corridor are lined with sky-blue plastic panels of brickbat pattern. The buffet ceiling is polar white and the floor is covered in marbled blue and grey tiles. A neat effect is obtained by continuing the grey marbled tile finish up the front of the counter.

Olive ash timber is used for the facia above the bar counter and for the sliding entrance door to the buffet compartment. In the alcove formed by the bar partition and the end wall is a barrel-shaped two-tier column table, supported by a tubular stanchion extending from floor to roof. The tube is chrome-plated and the table is covered in black and white plastic. The table is positioned to divide the passenger flow to and from the bar. The surface area of the partition is relieved by a deep cut-out near the counter and a vertical decorative strip of plastic, fluted glass, and a grille at the top.

Double-glazed Windows

Wedney large double-glazed windows, with sliding ventilators above each double-fixed glass, are fitted in the buffet. Below the windows is a row of tubular heaters covered with a slotted grille. Emergency exit doors are fitted at each side of the buffet compartment.

Glossy white plastic is used for the counter top, with built-in ashtray sockets in the front edge. On the counter top is a 9-ft. food display case of armour-plate glass held in chromium-plate frames. Below the counter are shelves for the storage of food and equipment.

Fixed to the roof over the counter is a box canopy covered with plastic to tone with the rest of the décor. The canopy, which embodies concealed lighting, carries an aluminium roller shutter which, when lowered, can be locked to the counter top.

Concealed lighting is also used for the back bar which is equipped with glass shelves for bottle display and storage. Bottle-cooling racks are fitted in the lower section. Access to the inside of the bar is through a sliding aluminium door in the adjacent sub-pantry.

The sub-pantry equipment includes a Still café set and a twin-bowl Stott stainless steel sink unit. Aluminium panels are fitted round these units. Ventilation is by one 9-in. Vent-Axia fan over the café set.

A particularly neat fitting is the tariff panel at the side of the counter. This is a flush-fitting inset frame with slotted carriers to hold the plastic letters and figures. Buffet lighting is by a row of roof-mounted, semi-recessed, rectangular light fitments.

The main scheme for the alternative décor, selected for 25 cars, is a shirt-stripe pattern in grey and white, with ice-blue ceilings. Grey and white is also used for the buffet compartment walls, partitions, and corridor. The buffet floor is patterned in tiles of marbled ebony and Bengal blue. Timber finishes are in mahogany and the back bar wall is in cornflower blue.

Kitchen Equipment

On the corridor side, the kitchen is equipped with a Slater two-oven range with grilles, hot-water tank, vegetable boiler, and café set. On the left of the range is a hot plate and serving hatch into the corridor. Between the serving hatch and café set is a sliding entrance door to the kitchen. A lift-up two-leaf folding table is fitted in the doorway.

On the opposite side is a twin-bowl stainless steel sink unit and a timber-covered working top above the storage cupboards. Above the bodyside windows is a full-length storage rack.

In the adjacent kitchen storage compartment is a large cupboard unit and a 45-cu. ft. capacity Frigidaire refrigerator.

Double-entrance doors facilitate loading, and access to the kitchen is through a sliding door. Mounted on the compartment partition is an emergency water-raising foot pump.

All cooking units use propane gas, the main supply shut-off valve for which is located inside the kitchen door. Kitchen ventilation is by three 9-in. Vent-Axia fans over the gas range and one over the Still boiler. Kynal aluminium treadplate, with aluminium covings, covers the floors of the corridor, sub-pantry, kitchen, pantry, and store.

Pantry Equipment

The pantry is equipped with a combined wine and bottle cabinet, a Hall bottle-cooling unit, cupboards, dresser, and cutlery boxes. Along the bodyside wall is a twin stainless steel sink unit with a sterilising unit. The refrigerator in the store compartment is directly accessible from the pantry.

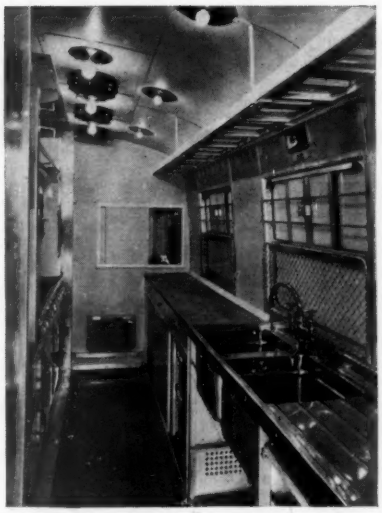
As a precaution against fire, the partitions of the kitchen, pantry, and store are of double-skin aluminium sheet construction, with Fibreglass wool packed in the cavity.

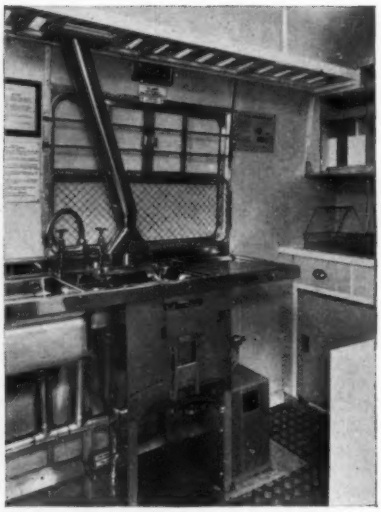
Except for the areas of bright aluminium around the units, the walls of the kitchen, pantry, store, and sub-pantry are finished in grey linette matt plastic and the ceilings in matt white plastic. The floors are covered in chequered aluminium alloy plates.

The staff compartment, which adjoins the pantry, is fitted with a bench seat for four persons, a folding table, and four personal lockers.

An overhead timber-slat parcel rack is fitted along the compartment sides and a cabinet on the cross partition. The partitions are covered with primrose plastic veneers and the floor covered with a matching shade of linoleum.

At the end of the vehicle is a staff lavatory, with wash basin and lavatory hopper in primrose yellow. The walls are finished in grey linette plastic veneers and the ceiling in polar white matt. The colours of the floor tiles harmonise with those of the plastic finish.





(Left) : view of kitchen, showing good working surfaces and storage adjacent to sink. (Right) : a corner of the pantry

The vehicles are of all-steel construction to British Railways standard design with the 9-ft. wide radial profile. Sprayed Limpet asbestos is used for roof insulation and Fibreglass wool for the bodysides and ends. Floor construction is a corrugated sheet of light alloy, a layer of Fibreglass, and a ¾-in. thick floor of plywood.

Standard Bogies

The all-welded underframe is mounted on British Railways standard double bolster bogies, with rubber vibro-insulators on the bearing springs. Two 21-in. vacuum brake cylinders are fitted, operating through equalised and compensated brake gear.

Couplers are of the standard buck-eye automatic type, using retractable side buffers.

Mounted in the centre of the frame are three cylindrical insulated copper water tanks having a combined capacity of 300 gal. Stone compressed-air-operated water-raising equipment, automatically controlled, is used to supply the water system inside the car.

Underslung Equipment

Underslung at one side of the frame are the propane gas cylinder containers and pressure regulator, and on the other side are the battery boxes and electrical control boxes. Condensing units for the refrigerator and bottle cooler are also carried on the underframe.

Battery charging is by a 180-A. Stone Tonum belt-driven dynamo. The underframe VIR cable wiring is run in conduit and Furse trunking. Throughout the kitchen and pantry Pyrotenax wiring is used.

Sub-contractors include the following:—

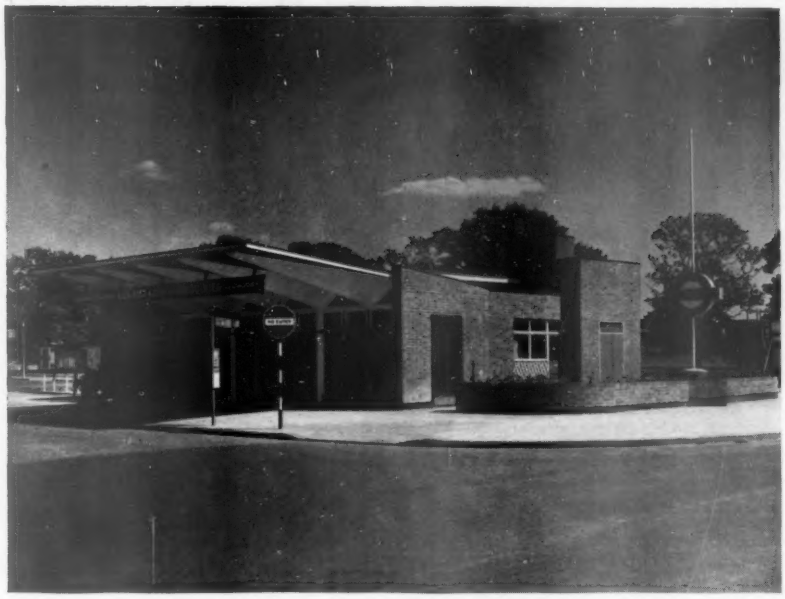
Kitchen range	J. Slater & Co. Ltd.
Sink units	J. Stott & Co. Ltd.
Café sets	W. M. Still & Sons Ltd.
Refrigerator	Frigidaire Division, General Motors Corporation
Bottle cooler	J. & E. Hall Limited
Water-raising equipment ...	J. Stone & Co. (Deptford) Ltd.
Roof extractor fans ...	Vent-Axia Limited
Roller shutters	Dennison Kett & Co. Ltd.
Bodyside windows ...	Hallam Sleigh & Cheston Limited
Sliding door gear ...	Beckett, Laycock & Watkinson Limited
Laminated plastics ...	Formica Limited Warerite Limited
Floor tiles	Letco Floors & Tiles Limited
Aluminium floorplates ...	Imperial Chemical Industries Limited
Limpet asbestos	J. W. Roberts Limited
Fibreglass	W. Gilmour Smith & Co. Ltd.
Axleboxes and bearings ...	Robert Hyde & Sons Ltd.
Wheels and axles	Owen & Dyson Limited W. Griffiths & Sons Ltd.
Springs	Steel, Peech & Tozer Limited English Steel Corporation Limited

Before and behind the buffet counter showing (right) aluminium roller shutter in closed position

TILBURY/GRAVESEND CAR FERRY.—During the summer holiday period from June 1 to September 30, an improved service is provided on the Tilbury/Gravesend car ferry of British Railways, Eastern Region. The vessels operate a 20-min. interval service.

New Bus Station Building at Crawley

London Transport and Southdown enquiry counters, tea bar, tea terrace, and waiting room for passengers



General view, showing flower-bordered tea terrace and new type of bus stop sign now in use at London Transport bus stations

A NEW bus station building in Three Bridges Road, Crawley, was opened on May 25. It includes a comfortable glass-fronted waiting room for passengers and inquiry and advance booking offices for both London Transport and Southdown bus and coach services.

The waiting room includes a tea bar serving light refreshments which can be taken out on a paved terrace surrounded by flower-boxes. There are also left luggage and parcel facilities and a staff canteen seating 40. Tea bar and canteen are served by the same kitchen. Public lavatories have been provided and are being maintained by the local authority.

The new single-storey building, which forms the focal point of the bus station and has been designed to harmonise with the general atmosphere of the New Town is faced in hand-made multi-coloured bricks with window surrounds of slate. A special feature is the tea terrace paved in 2-ft. by 1 ft. 6 in. grey-green slabs incorporating tile insets.

Timbered Roof

At the front of the building is a mono-pitched timbered roof, the cantilevered projecting "fingers" of which form a covered entrance. This roof is surfaced with 24-gauge copper. The remainder of the building has flat roofs with clerestory lights to the kitchen area to give adequate ventilation as well as light. These roofs are finished in ¾-in. asphalt on "Elasticell" screed on concrete. All copings are in slate.

The station has an area of 3,000 sq. ft. and is laid out with flower beds, the external publicity panel area being paved in beach cobbles. Inside, the walls of the public rooms have been finished in coloured plastic fabric applied to the plaster walls with an adhesive. Floors are finished with lino tiles, laid to pattern. In the working areas, cream glazed tiles have been used on the walls and heather brown quarry tiles for the floors.

Heating will be provided during the winter by oil-fired automatic boilers, and a similar though smaller boiler will be used for hot-water supplies the whole year round. Radiators are used in most rooms, but the glass window-wall of the tea bar and waiting room has floor-level skirting-type heating which produces a current of warm air over the glass and keeps the windows free from mist.

L.T.E. Design

The project was designed under the direction of Mr. T. R. Bilbow, F.R.I.B.A., Architect, London Transport Executive.

The main contractor was Whyatt (Builders) Limited, London, S.W.16.

A list of sub-contractors is given below.

Steelwork	Dawnays Limited
Precast concrete roofing	Fabricrete Products Limited
Terrazzo	Art Pavements & Decorations Limited
Asphalt work	Limmer & Trinidad Lake Asphalt Co. Ltd.
Floor and wall tiling ...	Walter Taylor Limited
Heating	Watkins Heating Co. Ltd.
Joinery	D. Burkle & Son Ltd.
Timber roofing ...	Rainham Timber Engineering Co. Ltd.
Elasticell screed and Dinova wall finish	Regent Surfaces Co. Ltd.
Metal windows	Senlac Metal Casement Limited
Patent glazing	British Challenge Glazing Company
Lionide wall finishes and fibrous plaster	Clark & Fenn Limited
Linoleum	Marbolith Flooring Co. Ltd
Ironmongery	Comyn Ching & Co. (London) Ltd.
Venetian blinds ...	J. Avery & Co. Ltd.
Illuminated signs ...	Falk Stadelmann & Co. Ltd.
Lettering	Frederick B. Hall & Co. Ltd.
Roller shutters and aluminium hoods	Arthur L. Gibson & Co. Ltd.
Shutter gates	Potter Rax Limited
Boilers	W. M. Still & Sons Ltd.
Kitchen equipment ...	Benham & Sons Limited
Refrigerator	Prestcold Refrigeration
Furniture	Pel Limited

Interior showing separate enquiry counters and self-service tea bar

Constitution and Working of Eurofima

Statutes of European international company for financing railway material purchases; results of the first three years

ALTHOUGH the decision to establish Eurofima was taken in 1955, that international company for the financing of railway-material purchases did not actually begin operations until November, 1956; and although its operations have been considerable, particularly since the end of 1958, when financing of diesel locomotive construction was undertaken in addition to the previous and concurrent wagon purchases, it is considered in some circles that its business hitherto may not have been facilitated by the time taken for all the interested governments to ratify the provisions. This was not accomplished until July 1959, though the convention establishing the company became applicable provisionally at the end of 1956.

Establishment

The way for the establishment of Eurofima (Société Européenne pour le financement de matériel ferroviaire) was made clear by the Conference of European Ministers of Transport at its session in 1955; and the parties to the international convention agreeing to its establishment were the governments of Western Germany, Austria, Belgium, Denmark, Spain, France, Italy, Luxembourg, Norway, the Netherlands, Portugal, Sweden, Switzerland, and Jugoslavia.

Reasons for agreement by the governments concerned to the establishment of the company may be quoted by verbatim abstracts from the terms of the convention:

(1) Considering that the railway can play its part in the general economy only if it is in a position to effect investments corresponding to a normal renewal and to an indispensable modernisation of railway material; that progress achieved in the standardisation of material and its joint operation finds its logical complement in the adoption of an international system of financing purchases.

(2) Considering that such financing is likely to be of real assistance in consolidating the technical efforts undertaken to ensure a progressive integration of the railways at the European level; that this financing is also particularly well adapted to railway material made up of standardised units, the ownership in which can be easily transferred from one country to another.

(3) Noting that the Company's objects are to encourage the equipment and operation, in the best possible conditions, of the public railway transport services of the contracting parties.

(4) Being desirous, in these circumstances, of giving the Company all possible support.

(5) Recognising that the action of the Company in the economic and financial fields must be facilitated by exceptional measures and that the formation and operation of the Company must not result for the Railway Administrations concerned in the payment of taxes and charges which they would not have had to bear if each financed its equipment in railway material by its own means.

(6) Considering that the credit of the Company, which must have recourse to loans in order to finance a considerable proportion of its transactions, can be established and maintained only on condition that the obligations assumed in its favour by the Railway Administrations are respected in all circumstances.

Formation

Actual formation of Eurofima was done by the state-owned railways of the countries listed in the first paragraph of this article; and it is these railway administrations which are the actual shareholders of Eurofima. They are: German Federal Railway, French National Railways, Italian State Railways, Belgian National Railways, Swiss Federal Railways, Netherlands Railways, Swedish State Railways, Spanish National Railways (RENFE), Luxembourg Railways, Jugoslav Railways, Portuguese Railways, Austrian Federal Railways, Danish State Railways, and the Norwegian State Railways.

Only State-owned railways of member countries of the Conference of European Transport Ministers can become shareholding members of Eurofima; but since the foundation of the company the original membership, as given above, has been increased by the addition of the Turkish State Railways and the Hellenic State Railways. British Railways is not, at the present time, a member of Eurofima.

The head office of the company was set up at Basle, in Switzerland, and the Swiss Government gave certain privileges to the company in relation to various forms of taxation and stamp duties. The governments which were parties to the Convention also made certain agreements that import and export of railway material into and from their countries could be effected without any resulting additional fiscal or customs charges as compared with those of direct import or export, and they also gave full guarantees in regard to their state-owned railway systems.

Statutes

Under the statutes of Eurofima, the objects of the company, which was formed for a period of 50 years, are:

(1) To obtain, under the best possible conditions, for the railway administrations which are its shareholders, as well as for other railway administrations or bodies, railway material of standard type or performance necessary to their operations, provided, however, in the case of railway administrations which are not shareholders, or other bodies, that one or more of the company's shareholders acts as principal guarantor.

(2) To this end, it shall arrange for the manufacture of such material, either on its own behalf or on behalf of the railway administrations or bodies concerned; in the former case it shall hire out or sell this material to the parties concerned.

(3) The company shall seek the necessary financial assistance, in addition to its own funds, in the form of loans. It shall undertake all commercial and financial operations required to attain its objects.

Registered capital was fixed at 50 million Swiss francs, and the 5,000 shares were taken up in different proportions by all the state-owned railway administrations listed earlier. The shares are of two types, viz.: A shares, fully paid up in cash; and B shares, paid up by bringing in wagons. Those railways taking up B shares in addition to a proportion of A shares were the DB, SNCF, FS, SNCB, and NS. The B shares have to be converted into A shares within ten years, the conversion to take place at the rate of one-tenth each year. Voting rights of the shareholders are in proportion to the number of shares held. The DB and SNCF are the principal shareholders, with 1,312 shares each (90 per cent B shares and 10 per cent A shares). The shareholders, in general assembly, appoint the board of directors, and the chairman and vice-chairman. Directors are appointed for a term of three years, and may be reappointed.

Of any profits remaining after deduction of amortisation, a portion corresponding to 5 per cent is allocated to a reserve fund until such time as that fund amounts to one-fifth of the registered capital paid up; this fund can be used only to cover deficits. The balance of any profit is then used to pay a dividend, up to a maximum of 4 per cent, on the A shares; B shares are not entitled to a dividend.

Operation

To determine the general principles of operation of Eurofima, the original shareholding railway administrations made certain agreements, the first in priority of which was that the operations of the company for the first two years of its life should be limited to railway administrations of states which were signatories to the Convention of the Conference of European Ministers of Transport establishing the company, and to wagons of standard type or performance to be incorporated in the European wagon pool.

From the expiration of that two-year period, however, purchases of other railway material could be undertaken and the scope widened to embrace other railway administrations; and it is to be noted that, in principle, any railway material—fixed or moving—can be acquired, though in the near future Eurofima proposes to acquire only rolling stock and motive power and parts

thereof. Diesel locomotive orders have been placed since the end of 1958. Such locomotives are for preference those of types standardised by ORE. But in article 3 of the Statutes the material to be obtained is stated specifically to be "of standard type or performance;" and though several types of diesel locomotives purchased by Eurofima have been ORE standardised models, as listed under ORE section B.13, others have not, for example, the S.N.C.B. 2,150 b.h.p. Co-Co class now under construction, and the German 1,150/1,200 b.h.p. V.100 class. Also, Eurofima naturally works in as closely as possible with its shareholding members in regard to any preference they may express for type or country of construction.

Method of Working

To enable Eurofima to work in a practical way, each railway which is a shareholder is bound to inform the company, upon request, of its general requirements in railway material of standard type or performance; to state to the company what portion of these requirements may possibly be met by it, and on the understanding that the railway administration shall always be free to meet all or part of its requirements by other means.

Eurofima then endeavours, in relation to its credit facilities, to co-ordinate portions of these requirements in annual programmes comprising comparable material, and invites tenders from as wide a field as possible. But that field may not always be very wide if the railway administration concerned should stipulate that the material, or as much of it as possible, shall be made in its own country, for it is specifically stated in the "operating" agreement: "While striving to obtain the most advantageous prices, Eurofima shall endeavour when placing orders, especially during its first years of operation, to harmonise its interests and those of the railway administrations with the legitimate interests of the national industry in the various countries."

In general, Eurofima floats a loan to cover each set of requirements, and this may be a long-term loan or a medium-term one, according to what is possible on the market and according to what shareholding administrations are willing to meet. But those railway administrations can also purchase outright from Eurofima, or they can obtain the material by hire-purchase from the company; and of course it has been in this latter connection that Eurofima has become so widely known in the railway world.

Standards and Hire-Purchase

Also it is in this connection that material to certain standards is of most importance. In regard to wagons it is fairly simple, because the question is governed by designs which could be accepted into the European pool, though there is nothing to prevent financing the acquisition of special types of wagons, and this has actually been done.

As far as diesel locomotives are concerned, it is mainly important that the units bought should be standard in regard to European loading gauge, couplings, brake connections, no excessive axle load, and the like, so that the locomotives can be transferred from one railway system to another should that ever be necessary. That kind of standardisation is also one reason why diesel locomotives have so far been preferred to electric locomotives in regard to financing, for there are many different electric systems among the shareholding administrations. Another possibility, which has also been practised, is that Eurofima can finance the purchase of certain constituents or parts of a complete unit of railway material, for example the transmission equipments or mechanical portions of locomotives; but in this case it is understood that certain of the complete units will be transferred to Eurofima as its property.

Under the hire-purchase contracts, which cover most of the locomotives and wagons ordered up to the present time, the material belongs to Eurofima until the last portion of the purchase price has been paid. The material, though registered in the stock of the hiring administration, has to bear the marking "Eurofima." The hire-purchase agreement may be over a long term, such as the 17 years of some of the locomotive agreements already in force and up to 20 years for wagons, or it can be of a much shorter time, even down to a few years, according to the type of loan which Eurofima can get and which a shareholding administration is willing to accept. Eurofima is not restricted as to the markets on which it can float a loan.

On any delay or default of payment over and above a statutory three months' grace, Eurofima is entitled to cancel the hire-purchase agreement with the railway administration concerned, and take possession of the material, without any refund to the defaulting administration. The material then is available for hire-purchase or sale to another member administration which may be interested.

Material under hire-purchase from Eurofima has to be maintained and repaired entirely by the hiring administration; and any damage must be made good by that administration. Moreover, in the event of total loss, even by *force majeure*, the hiring administration must replace the lost material at its own cost and without delay. Improvements or alterations to material on hire-purchase can be carried out by the hiring administration at its own cost, subject to the approval of Eurofima.

Three Years Working

Eurofima, which is now over three years old, had on December 31, 1959, achieved a balance sheet of Sw. fr. 235,000,000. The company is the owner of more than 5,600 freight wagons and 238 diesel locomotives (including those under construction), which are under hire-purchase contracts with 12 member railway administrations. A list of the diesel locomotive purchases made or under way is given in the table. Of the wagon total given above, 2,289 wagons represent those subscribed as B shares by member administrations.

S.N.C.F.	...	...	...	75	locomotives, O.R.E. class	*d*, model C (type 040.DE)
D.B.	...	...	...	14	,, ,,	*c*, model A¹ (V.60)
				25	,,	(V.100)
F.S.	...	...	...	29	,, ,,	*d*, model *D*
S.N.C.B.	...	...	...	27	,, ,,	*c*, model A¹ (V.60)
				8	,,	2,150 h.p. Co-Co
J.Z.	...	...	...	31	,, ,,	*d*, model C (040.DE)
C.P.	...	...	...	9	,, ,,	*d*, model C (040.DE)
R.E.N.F.E.	...	...	...	8	,, ,,	*d*, model C (040.DE)
T.C.D.D.	...	...	...	13	,, ,,	*c*, model A¹ (V.60)

The total given for RENFE is the number of locomotives owned by Eurofima; actually 10 locomotives are being built, but RENFE itself has financed the purchase of the oil engines being installed, and equal more or less to the price of two locomotives

Loan Markets

As Eurofima is a financial company, availability of capital is necessary for its development, and to some extent this depends on the money market and the guarantees which can be offered for loans. The improved situation in 1959 helped Eurofima to make more extensive calls on the money market. Apart from its capital (Swiss fr. 50,000,000) the company has been able since its creation to obtain loans totalling Swiss fr. 186,000,000 *plus* D.M. 5,000,000, and more than 50 per cent of these loans were obtained during 1959. Actually, three long-term loans (20,17 and 18 years) were floated in April, 1957, September, 1958, and September-October, 1959. Nominal interest rates are 4.5 per cent for the loans of 1957 and 1959, and 4.75 per cent for the loan raised in 1958; but in all cases the nominal rates plus charges and issue price are less than 5 per cent. Some shorter-term loans (5 and 10 years) totalling Swiss fr. 55,000,000 and D.M. 5,000,000, have also been raised at the same rates of interest; but for the Deutsche Mark loan a somewhat higher rate of interest is paid. But the increased business, and the efficient handling of the organisation at Basle, has enabled the company to reduce the commission covering working costs compared with the amount charged in the first two years.

Though the loans so far have been floated mainly on the Swiss market, the company has not lost sight of the possibilities of obtaining funds from the International Bank for Reconstruction & Development, the European Investment Bank and similar organisations; and though proposals along these lines raise certain problems, negotiations are still in progress.

A factor which has influenced some of the Swiss loans has been the demands made by Swiss industry, and passed on through a syndicate of bankers, to supply some of the purchases made by Eurofima; and this has been met by placing orders for certain equipment, though not for complete locomotives, with Swiss companies for material destined for hire-purchase to railways in countries which have not fully-developed industries of their own. Included in this type of business has been electric transmission equipment for 350 h.p. shunters of three-axle type for the broad-gauge system of RENFE.

ELECTRIC RAILWAY TRACTION SECTION

Interest in British Electrification

CONSIDERABLE progress has been made in the arrangements for British Railways Electrification Conference which, because of the encouraging support the British Transport Commission has received, promises to be fully representative of railway administrations throughout the world.

Over 40 papers on technical aspect of the 25-kV. a.c. system of railway electrification will be presented at the conference, during the first week of October, at which delegates will hear about developments taking place in this form of traction as applied to British Railways. The subjects will range over locomotives and multiple-unit trains, power supplies and distribution, civil engineering, interference problems, signalling and telecommunications, instrumentation and measurement, switchgear, and the catenary overhead system.

During the week before, and the week after, the conference delegates are being invited to visit the works of a number of leading makers of railway equipment who are playing a leading part in the electrification section of the railway modernisation plan. To cope with the varying interests of the overseas engineers who will be attending the conference these visits are to be divided into six principal categories. The locomotive industry will be one of these and delegates will have an opportunity of visiting a number of works and seeing the latest developments in locomotive building, including the construction of 25-kV. a.c. locomotives for British Railways. The second group of visits will be provided by the carriage and wagon building industry. The third will comprise a number of the most important works devoted to the electrical industry. Railway brakes, signals and allied accessories will form a group on their own, and so will the makers of overhead equipment, which will include cables and telecommunications. Finally, there will be a general group under the heading of ancillary railway equipment and accessories.

During the week of the conference visits will be made to two of British Railways electrification schemes. The first, on October 5, will be to the Crewe-Manchester line of the London Midland Region. At present this line is in the final stages of conversion and will be opened to electrified services during September. This is the first section of the electrification work on the London Midland Region main line between Euston, Birmingham, Manchester, and Liverpool. When the work is completed in 1964-65, it is hoped to operate express services between Euston and Manchester, and Euston and Liverpool in some 3 hr.

The second technical visit, on October 7, will be an inspection of the main features of the electrification work in the Eastern Region. The various projects comprise the Liverpool Street–Shenfield–Southend Victoria and Chelmsford lines originally electrified in 1949-56 on the 1,500-V. d.c. system, and now being converted to the 50-cycle a.c. system; the Colchester–Clacton–Walton branch, electrified in 1959 at 25-kV. a.c.; the Liverpool Street, Enfield, Chingford, Hertford East, Bishops Stortford lines, now being electrified on the 25-kV. system; the Fenchurch Street, Southend & Tilbury lines, now being electrified on the 50-cycle a.c. system; and the main line between Chelmsford and Colchester, which is to be electrified at 25 kV. a.c., thus permitting through running between Liverpool Street, Clacton and Walton. When the Colchester-Clacton-Walton branch was opened to electric services last year it became the first line in Britain to operate commercially on the new high-voltage a.c. system.

These schemes embrace a number of new features, including the first occasion where there has been an automatic change of voltage between 25 kV. and 6.25 kV. while the trains are in motion. The lower voltage is used in areas where the large number of bridges involved would have made the cost of obtaining clearances for 25 kV. exceptionally high. Delegates will be invited to visit the electric train depot at Ilford. This is one of the most modern in existence, and caters for the cleaning, servicing, and maintenance of electric multiple-unit stock which will be used on the Great Eastern and the London, Tilbury & Southend lines of the Eastern Region. Various types of multiple-unit train to be used on these different services will be on exhibition with the traction equipment and power bogies displayed for detailed inspection.

The exhibition at Battersea Wharf will be open during the conference week, and will consist of an outdoor section of five a.c. locomotives, two motor-coaches of multiple-unit a.c. trains, and a d.c. locomotive of the Southern Region Kent coast services; and an indoor section comprising electrical equipment exhibited by manufacturers holding contracts for a.c. electrification in connection with British Railways modernisation plan.

The conference may well prove to be a significant landmark in the development of a.c. electrification, while there is no doubt that the works visits will foster interest in the considerable achievements and skill of the British electric traction and railway supply industries to the advantage of their already high export trade.

Progress and Plans in Western Germany

CONVERSION of several sections of the German Federal Railway (Western Germany) at 15,000 V. a.c., 16⅔ cycles, is reported to be making good progress. The sections are: (a) in the Ruhr: Duisburg-Oberhausen-Wanne Eikel-Dortmund, Essen-Gelsenkirchen, and Oberhausen-Mülheim-Styrum (a total of 45 route-miles); (b) in Hesse: Frankfurt-Mainz-Wiesbaden (39 miles), Darmstadt-Aschaffenburg (27 miles), and Hanau-Friedberg (23 miles); and (c) in Bavaria: Dachau-Ingoldstadt (40 miles) and Höllriegelskreuth/Grünwald-Wolfratshausen (10 miles). It is hoped to electrify further sections, with the help of funds made available by the *Länder* (provinces) of the Federal Republic. The lines proposed for conversion are: (1) some 50 route-miles in the Stuttgart area; (2) the main line from Wiesbaden *via* Oberlahnstein to Cologne (about 150 miles); and (3) the trunk routes from Bremerhaven and Bremen, and from Hamburg, to Hanover and thence *via* Bebra to link up with the electrification in the Frankfurt area (about 650 miles). These conversions would bring the electrified route-mileage of the Federal Railway to over 3,000.

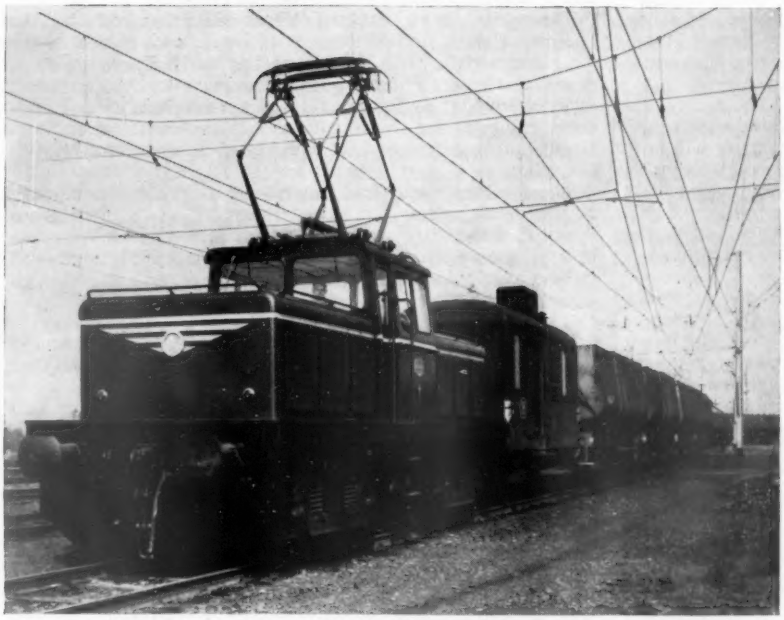
The 15,000-V. system is being adhered to, mainly because of the difficulty of changing over the extensive mileage already converted to this voltage in stages during the past 50 years, and of the advantages of common user locomotives and multiple-unit stock. The Swiss Federal and Austrian Federal Railways moreover use this system. Nevertheless it seems strange that in Germany, where the first beginnings were made with 50-cycle traction, on the Höllental line, in the Black Forest, no further use of this form of electrification seems to be envisaged at present.

No plans are reported for a link-up with the Netherlands Railways 1,500-V. d.c. and Belgian National 3,000-V. d.c. systems. In the case of the Dutch connection, extension of electrification in the Cologne area would bring the converted Bundesbahn lines near one or other of the frontier stations. The Netherlands Railways line to Venlo, near the German frontier, is already electrified. The Belgian National Railways does not propose for the time being to electrify eastwards from Liége to the frontier near Aachen. How far international traffic would justify these conversions is problematical. With passenger traffic the progress made in multi-voltage techniques seems likely to facilitate construction on a fairly large scale of locomotives and multiple-unit stock to run over lines converted at different voltages. It is now possible to travel by electrically hauled train from Cologne to Vienna, to Trieste, and (with the break of the Straits of Messina train ferry) to Palermo. A relatively small amount of conversion would make Amsterdam, the Hook of Holland, and Ostend the northern termini of such journeys.

Much the most important of the lines proposed for conversion are those from Hamburg and Bremerhaven to Frankfurt *via* Hanover, which will facilitate working of goods traffic between the ports and the industrial areas of the hinterland, but it is hard to see why these routes should have been preferred to that from the Ruhr to Bremen and Hamburg.

Belgian Electric Shunting Locomotives

Fixed-wheelbase and double-bogie designs to S.N.C.B. standards for a colliery railway system near Hasselt



Sixty-ton Bo-Bo locomotive rated at 830 h.p. hauling a train of empty coal wagons to the colliery

WHEN industrial installations require considerable electric power for their own processes it may prove economic to use electricity also for transport. Study of transfer and shunting requirements at the Houthalen colliery, near Hasselt, therefore led to the decision to electrify the colliery railway system, which with its own marshalling yards and the connection to the nearby station of the Belgian National Railways totals some 10½ miles of standard gauge track. The main contractor for the whole of this work, comprising a 2,700-kW. substation overhead system and five locomotives, was the Ateliers de Constructions Electriques de Charleroi. Mechanical parts of the locomotives were built by S. A. La Brugeoise et Nivelles, and the catenary lines were supplied and installed by S. A. Constructions et Entreprises, of Brussels.

There are two classes of locomotives on the system, one comprising two locomotives of 820 h.p. with the Bo-Bo wheel arrangement and the other three locomotives of 410 h.p. with a fixed two-axle wheelbase. Both have similar electrical equipment and conform in their buffing, drawgear, and other mechanical features with the requirements of the Belgian National Railways. The colliery lines are electrified at 600 V d.c.

Layout of Locomotives

The Bo-Bo locomotive has a centre cab and two bonnets. Two starting resistance banks with built-in motor-blowers are located at the end of each bonnet. Other principal items of equipment comprise, at one end of the locomotive, the motor-compressor set and the four line breakers, and at the other end the battery, motor-generator-blower set (serving all four motors) and compressed air equipment. The two-axle locomotive has an end cab and a single bonnet containing similar equipment to that in the four-axle design, but for controlling two motors only. All electrical apparatus is interchangeable between the two locomotives. The bogies of the 820-h.p. type are of the Pennsylvania pattern with the chassis carried on swan-neck equalisers of heavy sheet steel by highly resilient coil springs. A fixed pivot is provided in the centre transom of each bogie. In the fixed-wheelbase locomotives the suspension is by leaf springs.

Economic Running at Low Speeds

Both locomotive types are required to haul trains of 600 tons on the level and of 300 tons up a gradient of 1 in 166 in the colliery yards, and to undertake duties requiring accurate control and economic running at low speeds such as placing wagons on a weighbridge and setting them in position at the coal washing and sorting plant. The 820-h.p. locomotives working singly have to haul a train of 330 tons up a gradient of 1 in 77 and on curvature of 197 yd. rad. on the trip from Houthalen station to the colliery marshalling yard.

The same series-parallel controller is used in the two locomotive classes, the connections in the Bo-Bo series being arranged so that the two motors in each bogie are controlled simultaneously through their own resistance banks. Therefore the locomotive starts with two parallel circuits of two motors in series between line and earth, giving a series-parallel connection, and then changes to full parallel by parallel connection of the two motors in each bogie. The lighter locomotives have series and parallel groupings only by the appropriate interconnections of the two motors with which they are fitted.

Special attention has been paid in the

(*Continued on page* 660)

Two-axle 40-ton locomotive on the 600-V. d.c. system at Houthalen Colliery

High-Voltage Multiple-Unit Stock for British Railways

Four-car 25-kV. 50-cycle a.c. suburban trains for Manchester-Crewe and Liverpool-Crewe service

MULTIPLE-UNIT 25-kV. a.c. electric stock in four-car units is now in course of construction and delivery by the Wolverton Works of British Railways, London Midland Region. The electrical equipment has been supplied by the British Thomson-Houston Co. Ltd., now incorporated in the Associated Electrical Industries Traction Division.

The first 15 four-car trains are for operation on the Manchester-Crewe service and a further 20 trains are for the Liverpool-Crewe service. Each train consists of a battery driving trailer open second, motor open second brake, trailer composite, and driving trailer open second brake. The motor second brake on the Manchester trains is arranged with compartment seating for 96 passengers, giving a seating capacity for these trains of 19 first class and 318 second class. On the Liverpool service trains the motor second brake is an open saloon with seating for 72 passengers and is fitted with a large luggage compartment. The complete train has seating capacity for 19 first class and 294 second class passengers.

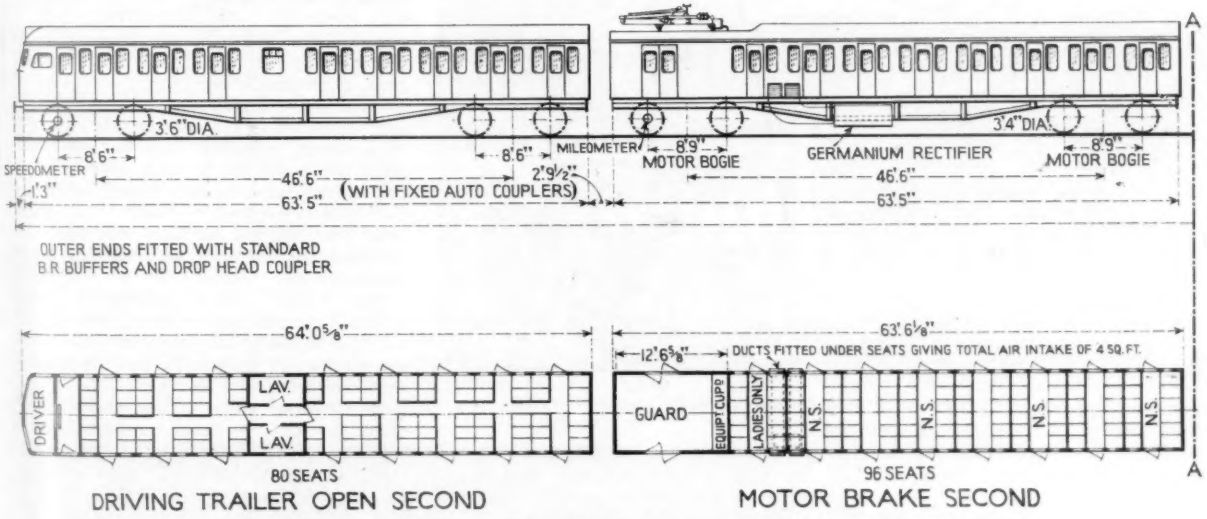
The first class seating in the trailer composite car is of the compartment type with corridor access to the toilet. A separate toilet is provided for the second class saloon. Toilets are also provided in one driving trailer. Coupling between the cars is by fixed automatic couplers without side buffers, no through access being provided. The design of this stock to British Transport Commission requirements has been carried out at Wolverton under the general direction of Mr. S. B. Warder and Mr. J. F. Harrison, Chief Electrical Engineer, and Chief Mechanical Engineer, respectively, of British Railways Central Staff.

Leading particulars are as follow:—

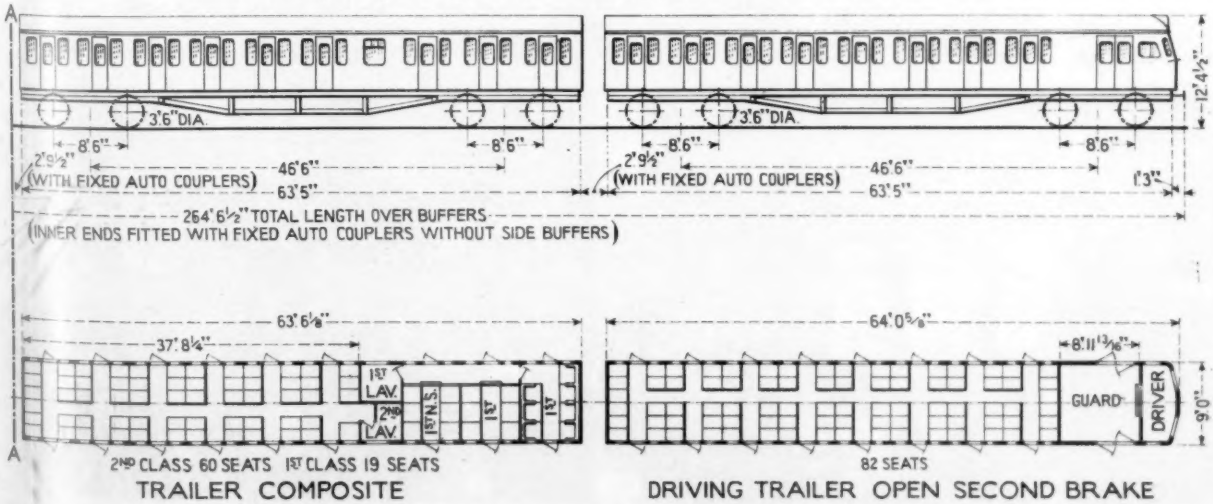
Overall length of train	264 ft. 6½ in.
Vehicle length over body	63 ft. 6½ in.
Width over bodysides	9 ft.
Height to roof panels	12 ft. 4½ in.
Bogie centres	46 ft. 6 in.
Bogie wheelbase—motor car	8 ft. 9 in.
Bogie wheelbase—trailer cars	8 ft. 6 in.
Wheel diameter—motor car	3 ft. 4 in.
Wheel diameter—trailer cars	3 ft. 6 in.
Maximum service speed	75 m.p.h.
Tare weights	
Motor car	53 ton 12 cwt.
Driving trailer	35 ton 12½ cwt.
Driving trailer—brake	31 ton 8 cwt.
Composite trailer	31 ton 5½ cwt.

Current Collection and Conversion

Current is collected from the overhead wire by the pantograph mounted, with the air-blast circuit breaker, on the roof



Elevation and layout of driving trailer and motor brake coach of Manchester-Crewe train



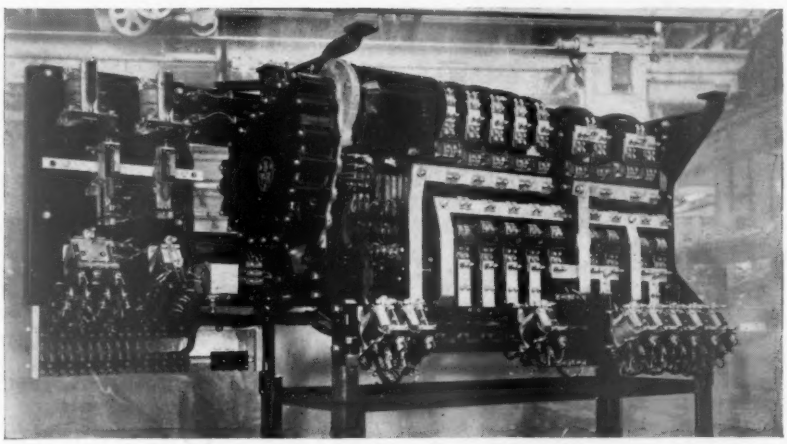
Elevation and layout of trailer composite and driving trailer brake coach

Four-car multiple-unit suburban train

of the guard's compartment of the motor car. A special rubber insulated 25-kV. cable runs from the roof gear and plugs into the transformer. The a.c. voltage is then stepped down by the oil-cooled transformer and converted by a germanium rectifier to a d.c. supply for the traction motors.

The equipment is designed for full output at a line voltage of 22·5 kV. or 5·65 kV. The air-operated changeover switch in the end of the transformer casing is automatically controlled by the automatic power control circuit and the voltage selection circuit.

The voltage selection circuit consists of a roof-mounted capacitor in series with the primary winding of a current transformer. The transformer output is fed into a germanium bridge rectifier having voltage selection relays connected across the output. Relay contacts control the selection switch and the air-blast circuit breaker. The main transformer incorporates a 240-V. 55-kW. winding for train heating and other auxiliaries.



Camshaft control unit, showing motor and reduction gear drive

The germanium semi-conductor rectifier is made up in a unit of ten trays, each tray carrying 48 cells. The trays are mounted vertically and supported on rails inside a sheet steel cubicle, a simple provision being made for withdrawing each tray for inspection. A fibreglass front cover is fitted to the cubicle.

Cooling of the cells is by a motor-driven Aerex fan, with a delivery of 3,500 cu. ft. per min. The rectifier is rated at 682 kW., 975 V., 700 A. Advantages claimed for the semi-conductor rectifier are that maintenance is virtually nil, no pre-heating period is required before applying the load, and no temperature control is required.

A further advantage is that efficiency is independent of the voltage. This permits the independent selection of a traction motor having the most suitable overall operating characteristics. The use of germanium rectifiers on this multiple-unit stock is the first bulk order for traction use.

Layout of Power Car Equipment

With the exception of a cubicle in the guard's compartment, all the power equipment is installed below frame level, between the bogies. The longitudinal members of the underframe form three bays, in which the equipment is disposed to give approximately equal wheel loading. In the outer bay on one side are the transformer, camshaft cubicle, and resistor bank. On the opposite side are the cooling fan, rectifier, oil radiator, reactor, choke, and contactor cubicle. In the centre bay are the auxiliary and control air reservoirs, air drier, oil filter, and air-brake cylinder.

The Stone-Faiveley pantograph and air-blast circuit-breaker are mounted on the roof of the guards compartment. In the equipment cubicle in this compartment are installed a fuse panel, the main fault indication panel, motor and equipment cut-out switches, motor-driven auxiliary air compressor, and auxiliary equipment associated with current collection and conversion. The main transformer header tank is also in this compartment.

On the battery driving trailer the main air compressor, auxiliary air reservoir, brake cylinder and battery charger are

Interior of first class compartment in trailer coach, left, and second class open driving trailer, right

grouped in the outer bay on one side. In the outer bay on the opposite side are the main reservoir, and the two battery boxes. The 110-V. Nife battery has an 80 Ah. rating. The fuse panel is in a cupboard at the rear of the driving cab. A neat layout of the underframe cables has been achieved by the use of a central steel trunk with moulded polyester side ducting to the individual items of equipment.

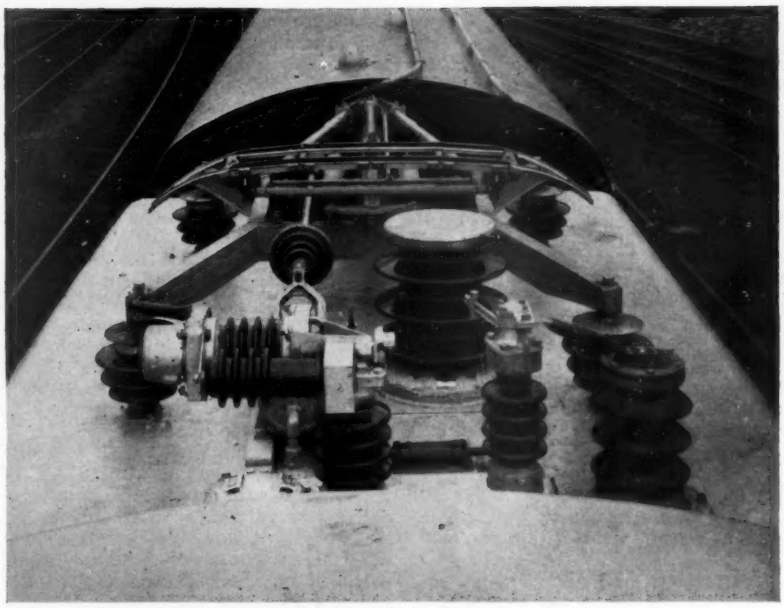
Control Scheme

The master controller has an Off and four motoring positions marked 1 to 4. Position one is a low-speed manoeuvring or shunting notch; two allows the camshaft to notch up to half voltage on the motors; three allows the camshaft to notch up to full voltage; and four causes the motor fields to be weakened in two steps for higher running speed. All the above camshaft movements are under the control of a current limiting relay, giving controlled acceleration of the train. Three equipments can be coupled together and will operate *via* train line wires from one cab.

The camshaft will move only when the reverser is set and the motor contactors are closed. It is driven by a d.c. motor through reduction gearing, and the power contacts are connected to tappings on half of the main transformer secondary.

The secondary is connected to operate on the buck/boost system, the camshaft making the reconnection at half voltage, and then running back over the tappings until full voltage is reached. This gives twice the number of notches for a given size of camshaft, compared with a single tapped secondary. Switching is by on-load low-voltage air-brake tap changing using a centre tapped reactor.

The four traction motors are connected in parallel. Power is cut off in the event of earth faults, an overload on the transformer or traction motors, high oil temperature or low oil level in the transformer, and failure of air supply for rectifier cooling. Fault location is shown on an indicator panel in the guard's compartment.

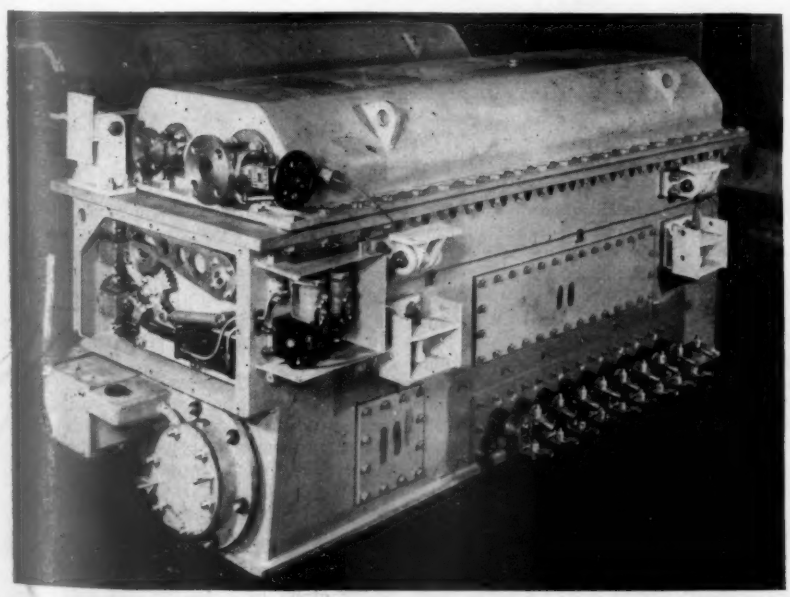


Pantograph roof of motor car, showing air-blast circuit breaker

Cooling and Auxiliaries

Air for the horizontally mounted cooling fan is drawn through two grilles in the bodyside. After passing through the rectifier the air passes through the transformer oil radiator, the tap change reactor, and the smoothing chokes. Neoprene rubber sealing is used to prevent air loss between the separate units. Circulation of oil through the transformer and radiator is by a motor-driven Pulsometer pump. The cooling fan and the pump are driven by A.E.I. flange-mounted single-phase capacitor start-and-run machines.

The main air compressor is a Westinghouse type CM38, driven by a flange-mounted A.E.I. d.c. motor fed from the 240-V. auxiliary supply *via* a germanium rectifier. A battery powered auxiliary compressor is also fitted. In the event of a fully discharged air reservoir, this is used to supply air for raising the pantograph and closing the air-blast circuit breaker. The battery charger, incorporating a germanium rectifier and magnestat voltage regulator, gives an automatically controlled d.c. output of 110 V. from a supply potential ranging between 192 and 310 V.



Main transformer, showing, left, the electro-pneumatic line voltage change-over switch with cover removed

Traction Motors

The four traction motors are six-pole self-ventilated nose-suspended machines, identical with the motors used on the Glasgow 25 kV. suburban stock. These motors incorporate special features to ensure satisfactory operation on d.c., with a large component of 100 cycles per second ripple current. One section of field divert resistance is permanently connected across each traction motor field. Provision is made for isolating either pair of motors.

The motors are rated as follow:

	Continuous	One hr.
Full field	1,320 r.p.m.	1,245 r.p.m.
	190 b.h.p.	212 b.h.p.
Weak field	1,695 r.p.m.	1,650 r.p.m.
	207 b.h.p.	220 b.h.p.

Timken roller bearing for traction motor suspension and single-spur reduction gears having a ratio of 17/70 are fitted.

The cab front has been styled to give an attractive appearance and good driving visibility. In plan view the cab front is of shallow vee form, with vertical

panels from floor to waist height. Above waist height the driving screens slope backwards, and at the top join a vertical panel carrying a four-digit route indicator.

The cab roof and ceiling are polyester-resin mouldings. Mounted on the rear bulkhead is a fully-adjustable seat on the left for the motorman and the assistant motorman's seat on the right. Balanced drop lights are fitted alongside each seat. Driving instruments are arranged on a sloping panel forward of the flat-top desk carrying the push-button controls and light switches.

The master controller is located on the right of the driver and the brake controller on the left. Forward of the assistant motorman's seat is the hand-brake wheel. Armour plate glass is used throughout for the cab lights and Trico-Folberth pneumatic screen wipers are fitted. Access to the cab is by a sliding door in the centre of the rear bulkhead. The cab walls are lined with plastic panels and the floor covered in linoleum.

Body Construction

The vehicle bodies are of welded steel construction, using 16-gauge sheet for the bodysides, ends, and roof panels. Under the pantograph the roof is in 14-gauge material. The pillars and rails are ⅛ in. "Z" or top-hat sections. On the Manchester trains all cavities in the double skin of the bodysides, ends, and roof are filled with fibreglass wool to provide the maximum degree of sound and heat insulation. On the Liverpool trains sprayed asbestos is used for insulation. Insulating material is also fitted between the corrugated aluminium floor plate and block-board floor panels. Rubber glazing is used for all windows, the windows on the Liverpool trains being of the wide type extending the full width of the panels between the bodyside doors. All doors are of light-alloy construction. Luggage racks are in tubular light alloy.

The interior finish of all passenger compartments is a blend of timber and plastic-faced panels. The toilets are lined with plastic panels in various colours, with aluminium mouldings and fittings and tiled floors.

Heating and Lighting

Current at 240 V. a.c. for heating is taken from a tapping on the main transformer. Passenger heaters are of the tubular type, rated at 500 W., giving a maximum of 45 kW. for each train. Control of the heating is from the guard compartments, with thermostatic control in the passenger compartments. Hot water is provided in each lavatory by thermostatically controlled 500 W. immersion heaters. A supply of 4·4 kW. is provided for crew compartment heating and in each guard compartment is a 300-W. food warmer.

Incandescent lighting at 110 V. is used throughout, supplied from the battery charger side of the battery contactor. Provision is made for the passenger lighting to be fed from a shore supply during coach cleaning. Each compartment is provided with battery-fed emergency lighting to a total of 150 W., which is available in the event of a failure of the main supply. To prevent excessive discharge of the battery a time delay switch is incorporated in this circuit.

Underframes, Bogies and Brakes

The underframe is a welded assembly of rolled channel, tee, and angle sections to British Railways standard design. The outer ends of each four-car set are fitted with telescopic side buffers and drop-head automatic couplers. Inter-car couplers are of the fixed automatic type, without wide buffers.

Double bolster bogies with knife-edge suspension are used, the motor bogie frames being built up from steel plates and rolled-steel sections, and the trailer bogies incorporating steel pressings for the main members. The principle members of both bogies are assembled by riveting. Roller-bearing axleboxes are used throughout.

The air brakes, with self-lapping electro-pneumatic control, are operated by a single cylinder through equalised and compensated brake rigging. On the motor car and the battery driving trailer a 16 in x 8 in. cylinder is used, and on the other trailer cars a 12 in. x 8 in. cylinder. Normal operating pressure is 50 lb. per sq. in. The handbrake in each driving cab operates through the power brake rigging on the wheels of the adjacent bogie.

The principal sub-contractors are as follow:—

Axleboxes	British Timken Limited Co. / The Skefko Ball Bearing Ltd.
Wheels and axles	Taylor Bros. & Co. Ltd.
Bolster springs	Turton Bros. & Matthews Ltd.
Buffing and drawgear	Laycock Engineering Limited / A. G. Wild & Co. Ltd. / The English Steel Castings Corporation Limited
Windows	Beckett, Laycock & Watkinson Limited
Screen wipers	Trico Folberth Limited
Bodyside passenger doors	Dean & Son Ltd.
Interior panels	Bakelite Limited / W. A. Bonnell Limited
Cab instruments	Westinghouse Brake & Signal Co. Ltd. / Associated Electrical Industries Limited
Heating and sound insulation	Fibreglass Limited / J. W. Roberts & Co. Ltd.
Electro-pneumatic brake equipment	Westinghouse Brake & & Signal Co. Ltd.
Route indicators	Transport Engineering & Equipment Limited
Destination indicators	E. W. Matthews Limited
Telephone equipment	Clifford & Snell Limited
Battery	Pritchett & Gold Limited
Oil pump	Pulsometer Engineering Co. Ltd.
Radiator	J. W. Lawrence & Co. Ltd.
Fan	Aerex Limited
Capacitors	British Insulated Callender's Cables Limited / Standard Telephone Cables Limited
Control and heating jumper connections	General Electric Co. Ltd. / English Electric Co. Ltd.
Speedometer and mileage recorder	Associated Electrical Industries Limited
Pantograph	J. Stone & Co. (Deptford) Ltd.
Air-blast circuit breaker	Brown Boveri & Co. Ltd.

Belgian Electric Shunting Locomotives

(*Concluded from page* 656)

control system to obtaining a very low effort on the first notch, suitable for gradual taking up of slack couplings before full tractive effort is applied, and for "inching" movements of the locomotive while attaching and detaching wagons. At the same time the control resistances have to be suitable for frequent starts with heavy loads and for the continuous running on resistance notches often necessary while shunting. Each resistance bank consists of two tapped sections in parallel so that the current is shared between the sections. The total effective resistance of a bank is therefore less than that of either section, but a higher resistance can be obtained by connecting only one section in circuit, when the full value of that section is effective. This procedure is followed on the first notch to reduce the initial tractive effort to the low level mentioned above. In the Bo-Bo locomotive, also, only one bogie is under power on this notch.

Motor blowers are connected across the last step of resistance so as to operate automatically as long as any resistance is in circuit. Thus there is no time limitation on the use of any of the 11 series and nine parallel resistance notches. The resistances are made of expanded metal grids of a stainless nickel-chrome steel. Two grids are mounted in each resistance casing and a fan at the top of each grid blows air downwards through it and out through an opening in the locomotive frame. Each grid is contained in a box which may be slid out of the casing.

The line breakers are electro-magnetic and provided with overload releases, but the notching contactors are cam-operated by a camshaft driven direct from the controller handwheels. Both locomotives have a single controller located centrally in the cab and equipped with two handwheels for easy manipulation when driving from either side. There is also an auxiliary control panel to the right of each driving position on which are mounted the switches and instruments for the operation of the auxiliary machines and services.

Both types of locomotive are equipped with the same traction motor, an axle-hung, nose-suspended machine with plain sleeve suspension bearings and the nose supported from the bogie frame by a set of springs. One-hr. rating is 205 h.p., 600 r.p.m., 280A., and the continuous rating 178 h.p., 640 r.p.m., 240A. When developing its maximum starting effort the motor current is 480A. Weight of the motor alone is 1 ton 11 cwt. and the weight with pinion, gearwheel, gearcase, and other accessories is 1 ton 19 cwt.

RAILWAY NEWS SECTION

PERSONAL

Mr. P. J. Adeane has been appointed to the board of Costa Rica Railway Co. Ltd. He succeeds Mr. W. N. Green who has retired.

S.L.M. (Swiss Locomotives & Machine Works), has announced the following appointments: Mr. Otto Haefels as Chief of Purchasing & Materials; Dipl. Ing. G. Nabholz and Ing. M. Frick to be responsible for Locomotive & Machinery Sales; Mr. H. Dobler to be Secretary to the Management; Mr. E. Boksberger to be Manager of Press & Public Relations; Mr. F. Zwicky to be Representative for the Chief of Purchasing & Materials.

Mr. Harbans Singh, Senior Deputy General Manager, Northern Railway of India, has been appointed General Manager, North Eastern Railway. Mr. S. S. Ramasubban, General Manager, North Eastern Railway, has been transferred in the same capacity to the Western Railway in place of Mr. B. B. Mathur, who, as already recorded, succeeds Mr. M. K. Kaul as General Manager, Northern Railway.

We regret to record the death on May 19, at the age of 65, of Mr. C. H. Frankland, a Director of British Insulated Callender's Construction Co. Ltd., from its formation in 1949 until his retirement in September, 1959.

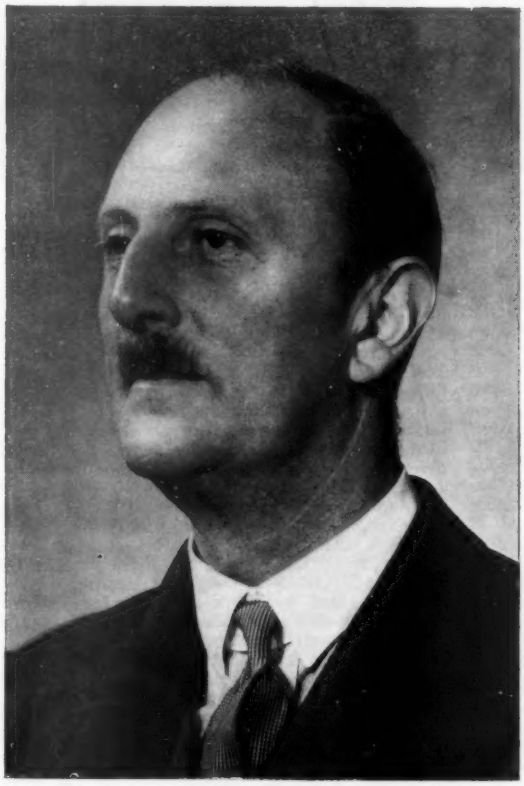
Mr. A. J. Peech has been appointed a part-time Member of the Iron & Steel Board, with effect from June 1. He succeeds Mr. N. H. Rollason, whose appointment expired on May 31. Mr. A. H. Wilson has been appointed an additional part-time Member.

Mr. W. W. Wood, Area Chief of Police, Western Area, British Transport Commission, has retired.

Mr. W. Lionel Fraser, who retired as Chairman of Babcock & Wilcox Limited, has been appointed first President of the company. Sir Kenneth Hague has been elected Chairman and Sir Reginald Verdon Smith becomes Deputy-Chairman.

The officers of the British Mining Equipment Export Association are as follow:
Chairman
Mr. C. R. C. Burton (International Combustion (Export) Limited).
Acting Director
Mr. D. G. Hemmant, B.Sc., M.I.Min.E. (Powell Duffryn Technical Services Limited).
Hon. Secretary
Mr. J. W. Law.
Committee
Mr. C. R. C. Burton; Mr. R. L. Aitken (M. B. Wild & Co. Ltd.); Mr. J. R. Bingham (Joy-Sullivan Limited); Mr. A. H. Bull (Oldham & Son Ltd.); Mr. B. A. Higgins (the Mining Engineering Co. Ltd.); Mr. H. Langford Holt (Dowty Mining Equipment Limited); Mr. L. W. Needham (Head Wrightson Colliery Engineering Limited); Mr. D. F. Stewart (Victor Products Limited); Mr. U. Baliol Scott (*Mining Journal*).

Sir Ralf B. Emerson, Chairman of the Nigerian Railway Corporation, whose term of office, as recorded in our May 27 issue, has expired, was born in 1897. He was educated at Bradfield College and the Royal Military Academy, Woolwich, which he joined from the ranks of the Royal Flying Corps in 1917. He was commissioned in the Royal Engineers in 1918, and served at home, in India, and in Iraq until 1927. He then transferred to civil employment with the Great Indian Peninsula Railway, and was appointed to officiate as General Manager of that system in 1939. Subsequently reverting to military duty, he was released to take up the appointment of General Manager of the same railway in 1944. Sir Ralf Emerson became Chief Commissioner of Railways in 1946. He attended the International Railway Congress at Lucerne in 1947, and retired from the Railway Board later the same year. In 1948, he joined the boards of the associated companies in the Dowsett group and was appointed Deputy-Chairman of Dowsett Engineering Construction Limited, Dow-Mac (Construction) Limited, Dow-Mac (Plant & Transport) Limited, Dow-Mac (Quarries) Limited, and Dow-Mac (Products) Limited, and Joint Managing Director of Brooke Marine Limited. He was appointed first Chairman & General Manager of the Nigerian Railway Corporation on its formation in 1955, and was awarded a Knighthood in the Birthday Honours List of 1956. In 1958, Sir Ralf Emerson handed over the office of General Manager, Nigerian Railway Corporation, to Mr. R. K. Innes and returned to England, retaining his appointment as Chairman of the Corporation. He was subsequently appointed a Director of the West African Provincial Insurance Co. Ltd. of Nigeria. He has recently joined the London board of the Provincial Insurance Co. Ltd.



Sir Ralf Emerson
Chairman of the Nigerian Railway Corporation, 1955-60

Mr. Frederick Gourley has been appointed Assistant to the General Manager, Merchandise Services, Canadian National Railways. Mr. Harold W. Berge becomes Assistant to the General Manager, Road Transport and Mr. Francis J. Sweeney has been appointed Chief Accountant in the same department.

Mr. G. E. Curtis, District Goods Manager, Broad Street, London Midland Region, has retired.

Mr. W. E. Bardgett has been elected President of the Institution of Metallurgists. He is research manager of the United Steel Companies Limited.

Mr. R. L. Rolph, Assistant Chief Engineer, East African Railways & Harbours, has been transferred from Associate Member to Member of the Institution of Civil Engineers.

Mr. H. T. Astley, District Engineer, Civil Engineering Department, Nigerian Railway, has been transferred from Associate Member to Member of the Institution of Civil Engineers.

Mr. Eric Greenwood, General Manager of Modern Machine Tools Limited and of Precision Machinery Services Limited, has been elected a Director of both companies.

Sir Donald Anderson has been re-elected Chairman of the Shipping Federation. Colonel W. L. Denholm has been re-elected Vice-Chairman.

Head Wrightson & Co. Ltd. announces the following appointments to its subsidiary companies: Mr. J. G. Allen as Managing Director, Head Wrightson Steel Foundries Limited; Mr. G. Jones to be Managing Director, Head Wrightson Stampings Limited; Mr. W. H. Mather as Managing Director, and Mr. G. Gowthorp as Commercial Director of the Head Wrightson Machine Co. Ltd.; Mr. T. H. Stayman as Managing Director of Head Wrightson Iron & Steel Works Engineering Limited.

Sir Joseph Latham, Deputy Chairman of the National Coal Board, is to retire for health reasons when his term of office expires on August 31.

Mr. J. D. West, Assistant Engineer (Bridges) to the Chief Civil Engineer, Eastern Region, British Railways, has recently been transferred to Membership Class of the Institution of Civil Engineers.

Mr. A. M. Porkess has been appointed Chief Engineer, National Gas & Oil Engine Co. Ltd., a member of the Hawker Siddeley Group. He was previously Chief Design & Development Engineer on medium speed engines for Ruston & Hornsby Limited.

Mr. P. Gibson

Appointed Public Relations Officer, Birmingham, London Midland & Western Regions

Mr. Patrick Gibson, Assistant Public Relations Officer, Liverpool, London Midland Region, British Railways, who, as recorded in our May 20 issue, has been appointed Public Relations Officer, Birmingham, London Midland & Western Regions, British Railways, joined the London Midland & Scottish Railway in 1938. After experience at various passenger and goods stations on the North Wales coast he enlisted in the Royal Navy in 1941. On demobilisation in 1946, Mr. Gibson entered the office of the District Traffic Superintendent at Chester, where he subsequently worked in the Advertising & Publicity Department. In 1952 he moved to Liverpool to the newly-formed District Public Relations & Publicity Representative's office, and in 1954 took charge of the Public Relations Section of that department. Mr. Gibson was appointed Assistant Public Relations Officer in Liverpool in 1958.

Mr. G. F. Prescott has been appointed a Director of British Resin Products Limited.

Transport Users' Consultative Committee

The following appointments to the East Anglia Area of the Transport Users' Consultative Committee have been announced. The Committee will serve until April 30 1963:—

Chairman
Captain W. H. Coombs.
Representing Agriculture
Mr. W. Inskip.
Representing Industry
Mr. A. C. Maton, Mr. L. A. Carey.
Representing Commerce
Mr. R. V. Pohlman, Mrs. B. E. Double.
Representing Shipping
Mr. M. O. Gill.
Representing Labour
Mr. J. A. Cook, Mr. W. J. Bird.
Representing Local Authorities
Mr. F. H. Easton, Mr. F. G. Taylor-Balls,* Mr. A. E. Meeks,* Mrs. G. Stirling.*
Representing the British Transport Commission
Mr. J. Hancock, Mr. L. H. Balls.
Additional Members
Mrs. M. H. Neal, Mr. P. Francis.
Secretary
Mr. F. E. Tyler.

Two members to represent agriculture have yet to be appointed.

*Indicates new member

Mr. A. G. Webster

Appointed District Traffic Superintendent, Ayr, Scottish Region

Mr. A. G. Webster, Goods Agent, Glasgow, Buchanan Street, Scottish Region, British Railways, who, as recorded in our April 22 issue has been appointed District Traffic Superintendent, Ayr, joined the former Great North of Scotland Railway as a clerk at Glassel Station in 1916. Having served at several stations, he was transferred to the Traffic Superintendent's Office, Aberdeen, in 1927, where he became an inspector and later a controller. In 1944 he was appointed Head of the Freight Plant & Shipping Section, District Operating Superintendent's Office, Glasgow. In 1947 he became Deputy Chief Staff Clerk in the joint section of that office covering operating, commercial and motive power staff. From 1948 Mr. Webster was successively Goods Agent, Glasgow (High Street), Goods Agent, Greenock, and Assistant Goods Agent, Glasgow (High Street & College). In 1952 he was appointed Goods Agent, Glasgow (Buchanan Street), the position he vacated on taking up his new appointment in the same Region.

Mr. St. J. Elstub, a Director of Amal Limited, has been appointed Deputy Chairman. He is also Joint Managing Director of the Metals Division of the parent company, Imperial Chemical Industries Limited.

Mr. R. J. Ellery has been appointed an additional director of the Richmond Park Laundry Co. Ltd. Mr. Ellery is Chairman of East Midland Motor Services Limited, of Trent Motor Traction Co. Ltd., and a Director of other bus companies.

Mr. J. Conning, formerly Production Manager, Power Cables Division, British Insulated Callender's Cables Limited, has been appointed Works Manager, Erith Works, responsible to the General Manager, Power Cables Division.

Mr. W. J. Heywood, Chairman & Managing Director, S. H. Heywood & Co., Ltd., has taken over the direction of the Reddish Crane Works in addition to the Manchester Electrical Contracting Works. He succeeds his late cousin, Mr. S. W. Heywood. Mr. W. Howe and Mr. A. L. Hawes, have been appointed General Managers of the Manchester and Reddish Works respectively. Mr. W. J. Heywood has been a Director of the company since 1934.

Mr. A. H. Moncrieffe

Assistant to the Commercial Officer, York, N.E. Region

Mr. A. H. Moncrieffe, Assistant to the Commercial Officer (Sales), York, North Eastern Region, British Railways, who, as recorded in our April 15 issue, has been appointed Assistant to Commercial Officer (Passenger), North Eastern Region, York, began his railway service in 1922, at Liverpool, with the former Cheshire Lines Committee. He then served at various stations and in departments of the Headquarters Office. During the 1939-45 war he was engaged on special duties in connection with rail depots damaged by enemy action. In 1949, following nationalisation, he was transferred to the London Midland Region as Chief Delivery Clerk, Canada Dock, Liverpool. He was appointed Chief Claims Clerk, District Goods & Passenger Manager's Office, Sheffield, later the same year, and in 1950 took up a similar position in the District Goods Manager's Office, Warrington. In 1952 he moved to the North Eastern Region to become Chief Claims Clerk, District Goods Manager's Office, Leeds. In 1954, Mr. Moncrieffe was appointed Head of Claims Section, Chief Commercial Manager's Office, York. In 1956, he was made Assistant (Claims) Chief Commercial Manager's Office, and in 1957 became Assistant to Commercial Officer (Sales), York, the position he now vacates.

Mr. Henry Snow has been appointed the first Industrial Liaison Officer of the Coil Spring Federation Research Organisation.

Mr. C. C. Mitchell, Director of Research & Development, Brown Bros. & Co. Ltd., has joined the board of directors of Bruntons (Musselburgh) Limited.

Institute of Traffic Administration

The following National Officers of the Institute of Traffic Administration have been elected for the year 1960-61:—

President:
Lord Merrivale of Walkhampton.
Chairman of National Council:
Mr. W. Lindley (Frames Tours, Ltd.).
Vice-Chairman of National Council:
Mr. K. J. P. Bowyer (Bowyer Plant Hire & Transport Limited);
Mr. W. Dale (Reed Transport Limited).

Mr. A. T. Hills (Shell Mex B.P. Limited) becomes a Vice-President on retirement from the National Chair.

NEW EQUIPMENT AND PROCESSES

Mileage/Kilometre Counter

A NEW axlebox mileage/kilometre counter for use with locomotives, carriages, and wagons, uses a calibrated disc instead of the usual digital counter. Housed in a sturdy water and dustproof cast aluminium alloy casing, the instrument can accommodate readings up to 300,000 miles or kilometres.

Further details can be obtained from Hasler Telegraph Works Limited, 26 Victoria Street, Westminster, S.W.1.

Diamond Dies

PHILIPS diamond dies, until now only obtainable on licences, are being marketed in the United Kingdom. The range covers dies for all main metal groups and can be supplied either in "normal" or "extra" carat weights. Prices are competitive and the current delivery period is eight weeks.

Further details of the range of dies available can be obtained from Philips Electrical Limited, Raw Materials Division, Century House, Shaftesbury Avenue, London, W.C.2.

Pneumatic Tools

NOISELESS operation is claimed for "Golden Silence" noiseless "Aro-Broomwade" high-torque pneumatic tools.

The basis of their design is a porous bronze fitting that breaks up and disperses the force of the exhaust. A deflector can be fitted to divert the exhaust air and its oil mist away from the operator, and an adaptor can be connected which, when used in conjunction with a hose, will enable the exhaust air to be conveyed some distance away.

The range consists of high-torque drills, push-pull tappers, and reversible screwdrivers and nutsetters.

The high torque drills range in speed from 2,100 to 500 r.p.m. Chuck size is $\frac{1}{16}$ in. for the 2,100 r.p.m. drill and $\frac{3}{8}$ in. for the remainder. Weight and length of the high-speed drill is 2·4 lb. and 7 in. respectively, and of the remainder 2·9 lb. and 8¼ in.

The push-pull tappers have speeds of 500 r.p.m. or 800 r.p.m. The tapping chuck is ¼ in. Weight is 3·9 lb. and length is 12¼ in. The tapping head is in forward rotation when the motor is running and automatically reverses when the tool is pulled back.

The reversible screwdrivers and nutsetters range in speed from 1,000 to 400 r.p.m. and are for screw sizes 4 to 10. A turn-button reversing action is fitted and the clutch is adjustable. The length of the high-speed tool is 9 in. and its weight is 3·1 lb. Length and weight of the other two models are 10¼ in. and 3·7 lb. respectively.

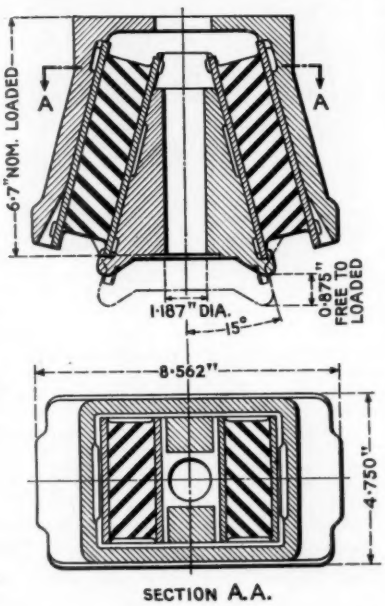
Further details can be obtained from the manufacturer, Broom & Wade Limited, High Wycombe, Bucks.

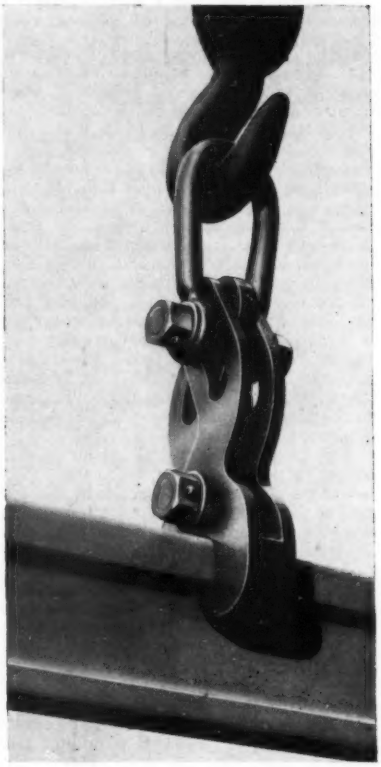
Spring Auxiliary for Primary Suspensions

LONG life and ample deflection with a constant stiffness rate are provided by a new spring auxiliary, which is easily fitted and has no loose parts.

Under vertical loads the rubber-bonded-to-metal "sandwiches" work in shear and compression to give high load capacity and the linear deflection characteristics essential in a spring auxiliary if maximum benefit is to be derived.

The design illustrated takes a load of 1¾ tons and has a vertical deflection of $\frac{7}{8}$ in.





The load capacity can be increased to 2¾ tons without an increase in dimensions by the insertion of metal plates in the rubber springs.

The manufacturer claims that the auxiliary's immediate sensitivity to the slightest track irregularity enables it to make a substantial contribution to passenger comfort and considerably to reduce bending stresses in the spring hangers by permitting movement in all planes.

Further details can be obtained from Metalastik Limited, Leicester.

Rail Clip

THE Goliath rail clip lifts and handles a wide variety of rail sections and is of robust construction despite its relatively small weight of 21 lb. It grips the rail positively in all circumstances, and it is impossible for its jaws to open accidentally. Extremely easy to handle, it can be attached and disengaged instantly. Each unit is tested to double the safe working load to comply with the 1937 Factories Act. Price is £9 17s. 6d.—prices for special rail sections will be given on application.

Further details can be obtained from Lifting Gear Products (Engineering) Limited, Goliath Works, Petre Street, Sheffield, 4.

Upholstery Fabric

HARLEQUIN is a new range of fabric suitable for upholstery fabric. It is available in 12 colours including black, ivory, greengage, coral, and tan. The fabric incorporates an anti-soil finish which considerably reduces the need for cleaning.

Further details can be obtained from the manufacturer, Bernard Wardle (Everflex) Limited, Caernarvon, North Wales.

Remote Control Equipment

THE Brush remote control equipment brings some of the latest digital computer techniques into the field of remote control and makes full use of the advantages of electronic switching to provide multi-channel signalling.

Normal multi-channel two-way signal links over long distances or over difficult terrain require a large number of conductors between the control centre and the remote location a factor which tends to make the cost prohibitive. The Brush equipment uses a time division multiplex system and only two pairs of conductors, thus greatly reducing cable cost and making such systems economical. Alternatively, the equipment can be used with carrier or v.h.f. radio links providing the necessary band-width is available. In certain cases band-width requirements can be altered to overcome restrictions placed upon the equipment by the type of link used.

The system uses digital computer techniques to produce a fast, safe, and reliable signalling service. It is designed for long periods of operation without attention and employs junction transistors and germanium diodes throughout thus not only saving power and space, but also cooling equipment. To ensure additional reliability of operation all components have been selected to operate well below their maximum limit and all relay where fitted can be hermetically sealed types. Construction is on the plug-in unit principle, each unit consisting of printed circuit boards with associated components. The number of different types of board is kept to a minimum and in the event of a failure, fault location is simple; a faulty board being quickly replaced and repaired at leisure.

A master unit is required at the control centre with a slave unit at each remote location. The master unit contains a pulse (clock) generator and a synchronising circuit which ensures that the counting circuits in the slave and the master are in time synchronism. The operating time of the equipment is determined by the clock frequency and the number of channels involved, although in a number of cases this time is lengthened by summating circuits which are fitted to eliminate the effects of random pulses picked up on the line.

Besides railway signalling applications, the equipment can be used for supervisory control and indication for power stations of all types, nuclear and process control, or telemetry of variable quantities. The equipment can operate from mains supply or batteries, or both as required and is designed to provide "fail to safe" conditions in the event of a failure of either power supply or equipment.

Further details can be obtained from the manufacturer, Brush Electrical Engineering Co. Ltd., Loughborough.

Solventless Epoxide Coating

A SOLVENTLESS liquid epoxide resin/hardener system has been developed for the protection against corrosion of metal surfaces. The system will provide a coating of up to 0·010 to 0·015 in. thick in one application, a coating ideally suited to structure steel work and most other metals, wood, and concrete.

In this system, in which pigments can also be incorporated, the hardener cures the epoxide resin under widely-varying conditions of temperature and humidity to give hard, tough and chemically-resistant films. The thickness of the films can be varied by incorporating differing amounts of filler in the resin/hardener mix.

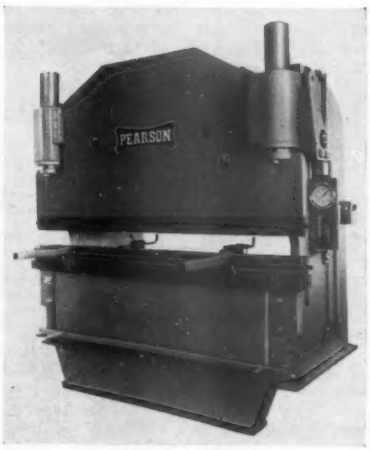
By careful formulation, minimum drainage of films on vertical surfaces has been achieved. Flow-out is excellent and the films will harden overnight under normal ambient conditions.

Full details of this new development can be obtained from Bakelite Limited, 12-18, Grosvenor Gardens, London, S.W.1.

Electrode-Hydraulic Flanging Presses

A NEW range of electro-hydraulic flanging presses from 50 tons capacity upward provides power return of the ram instead of return by hydro-pneumatic accumulator as previously. This has the advantage of a more positive action, giving greater return speed, and is particularly useful when the press is being used for punching work in withdrawal of the dies.

Hydraulic stroking is longer, size for size,



than in the manufacturer's previous range of machines and up-stroke and down-stroke variation are offered over the whole length of hydraulic stroke.

Another new feature is the incorporation of a magnetic clutch between motor and pump so that the multi-cylinder radial pump only runs when the press is actually stroking, thus minimising wear.

Further details can be obtained from the manufacturer, the Pearson Machine Tool Co. Ltd., Walker, Newcastle-on-Tyne, 6.

Electrode

THE Ruby range has been extended by a 14-gauge solid extruded, rutile-based electrode which is suitable for use in all a.c. welding positions on mild steel, with open-circuit voltage of not less than 45 V. The BS. 1719 coding is E217. Slag is easily controlled so that open-arc or touch-welding techniques can be used with a low degree of spatter.

Mechanical properties include a yield point of 24 to 28 tons per sq. in. and an ultimate tensile strength of 29 to 34 tons per sq. in.—carbon content is in the range 0·08 per cent to 0·10 per cent and manganese content is between 0·55 per cent and 0·65 per cent. Core diameter is 0·104 in. and length is 12 in. The current range is 65 A. min. to 80 A. max., and deposition rate at 72 A. is 71·7 lb. per cwt. of electrode.

Further details can be obtained from the manufacturer, Cooper & Turner Limited, Vulcan Works, Vulcan Road, Sheffield 9.

Electronic Computor

THE 1301 is an advanced new magnetic-tape electronic data-processing system designed to provide the right computing power and speed for business problems of all shapes and sizes. It can be applied to fit any size of business, can be expanded on site, and is simple to install. It uses little power, generates little heat and does not occupy a large space. Once the basic systems analysis has been done, the 1301 can be put into operation quickly. In particular much of the time-consuming drudgery of programming has been eliminated by the provision of automatic coding facilities.

The manufacturer has at customers' disposal an extensive library of "utility routines"—ready-made or standard sections of a programme which can be incorporated in the customer's own programme. A typical example might be the method of calculating P.A.Y.E.

The 1301 has been designed as a flexible multi-unit assembly and the number and variety of units can be specified to suit the work in view. In its simplest form it is a very fast punch-card computer with high-speed input and printed output, backed by core and magnetic drum storage and coupled to an extremely powerful central processor. In its full make-up the 1301 is a comprehensive magnetic tape data processing system capable of handling applications from routine accounting and book-keeping to advanced industrial mathematics, operational research, and management control.

Capital cost varies according to specification. A basic installation would cost approximately £65,000, but a comprehensive system employing magnetic tapes and core stores might well cost twice or three times as much according to individual requirements.

The units available for the 1301 system include :—

i. A photo-electric card reader, operating at 600 cards per min.
ii. Two types of internal storage, magnetic core and magnetic drum, with a choice of capacities allowing both types to be increased in convenient steps.
iii. Alternative types of magnetic tape transports giving data feed speeds of either 90,000 or 22,500 decimal digits per sec.
iv. An output line-printer operating at 600 lines of up to 120 characters per min.
v. An output card punch running at 100 cards per min.

Further details of this, and information on other electronic installations, can be obtained from the manufacturer, I.C.T. Limited, Gloucester House, 149, Park Lane, London, W.1.

Hammers

THE Stanley range of hammers has been augmented by three lightweight models: a 6-oz. Warrington pattern hammer (No. W.00, price 7s. 3d.), a 3½-oz. Warrington pin hammer, sometimes known as a telephone hammer (No. CP/3½, price 6s. 9d.), and a 4-oz. ball pein pin hammer (No. BP/4, price 6s. 6d.).

All have "Evertite" processed handles which are pre-shrunk and treated to ensure that the heads will not come loose.

The highly-polished, drop-forged heads are individually hardened and tempered on faces and peins and rim-chamfered.

Further details can be obtained from the manufacturer, Stanley Works (G.B.) Limited, Rutland Road, Sheffield 3.

Ministry of Transport Accident Report

Stobswood Occupation Level Crossing, September 15, 1959 *: British Railways, North Eastern Region*

Colonel J. R. H. Robertson, Inspecting Officer of Railways, Ministry of Transport, inquired into the accident which occurred at about 10.57 a.m. at Stobswood Occupation Level Crossing on the East Coast main line between Chevington and Widdrington stations. The 10.35 a.m. Alnwick to Newcastle up diesel passenger train, running at about 50–55 m.p.h. under clear signals, struck a loaded lorry which was passing over the crossing, and for which the gates had been opened so soon as a down mineral train had passed. The lorry was flung clear of the main line and wrecked, and its driver injured. The leading bogie of the train was derailed, and the driver's cab was stove in on to the driver, who died at once of his injuries. Five of the 30–40 passengers were slightly injured.

As the train ran on, its derailed bogie struck and completely derailed a 20-ton goods brake standing on an adjacent siding 63 yd. beyond the crossing. The train came to a stand 58 yd. further on.

The staff at the adjacent colliery at once called a doctor and rendered assistance in other ways. The crossing keeper telephoned for an ambulance, which arrived at 11.25 a.m.

The up main line was blocked, but the down line was clear, and single-line working was introduced at 12.18 p.m. The up main line was considerably damaged, but normal working was resumed at 8.50 p.m.

The weather was fine and dry, with good visibility.

Position of Crossing

This crossing lies between Widdrington North signalbox 1,483 yd. away in the down direction, and Widdrington station signalbox 1,148 yd. in the up direction. The up line approaches the crossing on a rising gradient of 1 in 343, and the driver of an up train first sees the crossing when he is 550 yd. from it. The speed limit is 80 m.p.h.

The crossing serves mainly Stobswood Colliery and the Burn Fireclay Company brickworks. During the users' working day the crossing is manned by a crossing keeper, and is used by 120–135 road vehicles a day. Some 55–65 trains pass over the crossing while it is manned.

On the down side of the crossing there is one field-type gate, opening away from the railway. On the up side there are two field-type gates which close on one another. When closed they lie at an angle across both the road and a connecting line from a siding into the colliery. All the gates are hand operated and are normally closed and padlocked against road traffic. It takes about 1 min. to open the gates.

There is a gate cabin on the down side adjacent to the gate. It has a direct independent telephone circuit to Widdrington station signalbox, and also repeater block indicators, up and down, and two repeater block bells. Both indicators and one bell are on a shelf in the cabin. The second bell, in parallel with the first, is a loud-sounding bell fixed on the outside of the cabin and audible from the far side of the crossing.

Working instructions and details of the various bell signals are displayed in the cabin. The instructions state that when the up line indicator shows "line clear," the crossing keeper must ask permission from the Widdrington station signalman, before opening the gates.

If the indicator shows "Train on line" he must not open the gates until the train has passed or been cancelled. As regards down trains, the gates must not be opened if the indicator shows either "line clear" or "train on line," until the train has passed or been cancelled. The instructions also call attention to Rules 99 and 101, relating to the opening of gates, but they do not deal with the working of the gates when the connecting line to the colliery is being used.

Damage to Diesel Train

The up diesel train was a two-car set, and the three forward facing windows and also the driver's side lights were of toughened glass. The damage to the driver's cab was considerable. The whole front of the driver's side was stove in, flinging him back through the transverse partition behind. Glass in the front windows crumbled, admitting a large quantity of loose fireclay from the load of the lorry, which half-buried the driver.

The brakes were still on 2½ hr. after the collision. The driver's brake valve handle was mid-way between the full application and lap positions, but it may have been forced into that position by the collision. Vacuum pipes had been fractured, and so the brakes would have been fully applied by the effects of the collision, whether or not the driver had first applied them.

Examination of the lorry showed that the impact must have knocked it from under its load of fireclay, and the clay, by the inertia of its 8 tons, must have stove in the front of the diesel.

The signalman at Widdrington North said that he accepted the up diesel from Chevington (the box in rear) at 10.51 a.m. He at once got acceptance for it from Widdrington station box, and both signalmen agreed that the block indicator was at once put to "Line clear." The Widdrington North signalman received "Train entering section" from Chevington at 10.55 a.m. and immediately sent forward the (specially authorised) "Train approaching" signal. Meanwhile he had received "Train entering section" signal for the down mineral train from Widdrington station at 10.54 a.m., and had put his down indicator to "Train on line."

"Train entering section" was sent forward by the Widdrington North signalman as the up diesel train passed him at 10.56 a.m., but the Widdrington station signalman admitted that owing to other work he might not at once have put the block indicator to "Train on line." This happened occasionally, and then a fast train might have reached the crossing first.

Allowing Road Vehicles to Cross

He was the signalman from whom the crossing-keeper had to seek permission before allowing a vehicle to cross the line whenever the up indicator showed "Line clear." Permission had not been sought on this occasion, nor had this crossing keeper telephoned him at all that morning. The crossing keepers seldom asked his permission for a vehicle to cross. He had never told them to use their discretion, but always gave them a definite answer. His habit was to refuse permission once he had received "Train approaching" from Widdrington North. The crossing keeper had sometimes, and despite the instructions, asked his permission when a down train had been signalled, and he had sometimes given it in the case of a slow mineral train. He heard of the accident from the crossing keeper at 10.58 a.m., and at once sent "Obstruction danger" to Widdrington North and informed control.

The crossing keeper on duty at once admitted that he had opened the down side gate as soon as the mineral train had passed, although he had seen "Line clear" on the up indicator and knew it was for the diesel train.

He had not sought permission from the Widdrington station signalman, nor had he looked properly along the line to see if it was clear. He had not needed to walk over the crossing to open the up side gates first, in accordance with Rule 101, because he had opened them 20 minutes before to allow the morning pick-up goods train to shunt into the colliery, and in accordance with his usual practice had left them open.

This left the up side gates open to the road, and in accordance with his usual practice he had been standing there to stop any vehicles crossing from that side. This last was confirmed by the guard of the pick-up goods train.

When he saw the lorry approaching, he walked over to his cabin and looked at his indicators. The down indicator was at "Train on line" for the mineral train, which by then was passing over the crossing. The up indicator was at "Line clear" for the diesel.

He had heard the "Train approaching" signal for the latter train, but only, he thought, a very short time before, and he had estimated that this train was only just his side of Chevington (*i.e.*, about 1½ mile away). He had not heard the "Train entering section" signal, but thought it might have been drowned by the noise of the passing mineral train. He had looked out of his windows, but had seen nothing on the up line because of the passing mineral train.

He had then gone out and opened the gate for the lorry so soon as the mineral train had passed and without trying to get a clear look along the line. He had relied entirely on his estimate of where the diesel train was. He was emphatic that he had not heard the "Train entering section" signal and that the indicator had still shown "Line clear" when he went out to open the gate. The lorry at once drove straight on to the crossing. When telephoning immediately after the accident, the crossing keeper saw that the indicator then showed "Train on line."

Evidence of Lorry Driver

The lorry driver said that the mineral train had cleared the crossing by 200–300 yd. when he started to cross. He had looked both ways, but had not seen the diesel train until a second or two before the collision. He had then accelerated in an attempt to get clear. He estimated his speed over the crossing at 5 to 8 m.p.h.

Evidence from passengers in the diesel train and also from its guard suggested that the driver had not applied his brakes before the collision. The driver had made good use of his horn, but no-one could remember if he had used it when approaching the crossing. A passenger seated just behind the driver escaped injury, although he was "spattered" with tiny fragments of toughened glass.

The crossing keeper had been serving as such for five months, for the first three weeks of which he had been under instruction. Though well acquainted with the rules and instructions, he admitted that it had been his usual practice to use his own discretion and not to ask the Widdrington station signalman for permission when the instructions said he should do so. He claimed that he had been so taught by both the crossing keepers

who had instructed him. They had told him that they did not follow the instructions because it was hard to attract the signalman's attention, and if they succeeded the signalman would only tell them to use their own discretion.

The crossing keeper emphasised that he was only doing the work in the way he had been taught to do it. He claimed that when he did use the telephone most signalmen were slow in answering and then had either refused permission or had told him to use his discretion. He agreed, however, that the signalman on duty at the time of the accident usually answered quickly.

In deciding whether to allow a vehicle to cross, he mainly relied on knowing what sort of a train it was and where it had actually got to, from the bell signals he had heard and sometimes from the aspects of such fixed signals as he could see. As a check he usually looked along the line as well. He had treated both up and down lines in the same way. He had only telephoned the signalman on the rare occasions when he was in doubt as to the whereabouts of a particular train—perhaps through missing a bell signal or not knowing to which of two trains a bell signal referred.

He had never told the stationmaster that he had had difficulty with signalmen, nor, when examined on the instructions, that he had been taught differently by his instructors. He agreed that the stationmaster had told him that if he obeyed the instructions and took no risks, he would be all right.

The Widdrington stationmaster, who supervised the crossing, said that he had visited the crossing-keeper while under instruction, and was quite satisfied with his progress. He had examined him in the working of the crossing and also on the equipment and instructions, but not on the bell signal code. He had subsequently visited him about three times a fortnight and had never seen any irregular working. He had no doubts about his ability to work the crossing correctly.

Tests showed that at a speed of 50-55 m.p.h. an emergency brake application would be felt by passengers within 1 sec. and that the train would continue for at least 20 sec. and 330 yd. before coming to a stand. Another test showed that, allowing for the presence of the down mineral train, the driver of the diesel probably had the lorry in full view for about 3 sec.

Inspecting Officer's Conclusion

Colonel Robertson finds that neither the lorry driver nor the driver of the diesel train was in any way to blame for the collision. The crossing keeper was responsible because he opened the down side gate for the lorry without asking the signalman's permission, when he had seen that the up line indicator was at " Line clear " and knew it was for the diesel. This was in disobedience of the instructions which he fully understood. In doing so, he was following an irregular practice which had grown up at the crossing and had escaped the vigilance of the stationmaster.

Colonel Robertson thinks that in adopting this irregular practice, the crossing keeper had also accepted his predecessors' explanation that signalmen would be slow to answer and unhelpful, without really testing their co-operation.

The collision would have been averted if at the time the crossing keeper had had to cross the line first to open the far gates. But these had been left open. This again, though customary, was against the instructions.

Colonel Robertson adds that the fact that an irregularity has become a custom does not make it any less irregular. He states that the instructions do not make unreasonable demands upon the crossing keeper.

The line between Newcastle and Berwick is to be resignalled, and the crossing will then come under the protection of colour-light signals controlled by Widdrington signal box, from which it will be electrically controlled. Meanwhile, the present instructions should be adequate if strictly enforced.

The practice of leaving the up side gates open for long periods while the pick-up goods train was inside the colliery was irregular. The arrangement of the gates was also unsatisfactory, but they are being rearranged so that one can be left open for shunting while the other is across the road.

A passenger's fortunate escape emphasises the value of toughened glass. A recent decision of the B.T.C. lays down that all transverse partitions are to be fitted with it in place of plate glass.

There were five similar collisions in 1953, and in each case the train was very little damaged. In this case the driver was killed because the full shock of the train's impact with a heavy mass was taken by the front of his cab, and not by the buffers and underframe.

This is the first time that this has happened, and in the circumstances the driver would probably have been killed even if his cab had been a good deal stronger; but the British Transport Commission is considering the practicability of strengthening the front of future diesel railcars with a view to increasing the protection for the driver.

Electrical Switchgear and Distribution Equipment

Ottermill products at the Birmingham Engineering Exhibition Centre

An exhibition of Ottermill electrical switchgear and associated equipment was held recently at the permanent Engineering Exhibition Centre at Birmingham. The exhibits included a range of the equipment as supplied to British Railways for works, depot, and station installations.

For the control of installations on medium-voltage a.c. systems the standard metal-clad switchboards are pedestal-mounted, free standing.

Fuse switches or oil circuit breakers up to 1,200 A. capacity are built up in any required combination. Cubicle-type switchboards are built up from a number of standard height and width unit cubicles. Each unit carries air circuit breakers of up to 2,000 A. capacity, or other equipment as may be required.

Provision for metering and instrumentation with selector switches is by hinged panels at the top of the board. Individual cubicles are connected by air-insulated bolted busbar connections, with phase colouring for identification. Cable entry boxes are incorporated inside at the rear.

The exhibits also included a comprehensive range of the Ottermill rising main, busbar, miniature busbar, and cable tap trunking systems for power distribution. With a maximum rating of 100 A. the miniature busbar equipment is particularly suitable for depot and station installation, supplying auxiliary power at numerous points for static train lighting, heating, or cleaning. The trunking consists of coloured p.v.c.—covered busbars enclosed in a light steel duct, with a tapping off point every 2 ft. along the trunking. Each position is furnished with a combination fuse unit and connections from the busbars to the external load can be made in safety with the busbars " alive."

In the standard busbar trunking system, which has a rating of up to 600 A., air-insulated rectangular copper bars are enclosed in steel trunking. Covers are fitted at 2-ft. intervals along the trunking, so allowing tapping boxes to be plugged in on the bare conductors at points adjacent to the power requirements. The boxes are fitted with h.r.c. cartridge fuses. Connections to the live busbars are made by contact clips on the tapping boxes of the type used in knife switches.

Alternative forms of incoming cable units covering all types of power cables are available for attachment to the tapping boxes.

Rising Main Equipment

The rising main equipment uses a similar form of rectangular busbar enclosed in steel ducting. Removable covers are fitted at 3-ft. intervals and semi-permanent or permanent tappings are made by bolted-on connectors attached to the busbars. The air-insulated busbars are well supported and fire-resisting barrier plates are built into the ducting at floor levels as required. Expansion joints are fitted at suitable intervals and phase indication is provided on each busbar.

The equipment described is manufactured by Ottermill Switchgear Limited, 1, Victoria Street, London, S.W.1.

Ottermill low-tension fuse switchboard as installed in Crewe Locomotive Shed

Indian State Railways Annual Dinner

Efficiency and esprit-de-corps of Indian railwaymen. Impressions of a recent tour

The annual reunion and dinner of officers of the Indian State Railways (India and Pakistan) were held at the Rembrandt Rooms, London, S.W.7, on May 30; 151 officers and their ladies attended the reunion and 140 officers were present at dinner.

Mr. G. A. Rowlerson, late Member (Transportation) Indian Railway Board, took the chair at the dinner.

Brigadier C. A. Langley, Chief Inspecting Officer of Railways, Ministry of Transport, who was seconded to the Great Indian Peninsula Railway in 1927–33, served in India as D.Q.M.G. (Movements & Transportation) Allied Land Forces, South East Asia Command, in 1943–45, and visited India in December, 1959, to attend the Enlarged Meeting of the Permanent Commission of the International Railway Congress Association, proposed the toast of the railways of India and Pakistan.

Impressions of Indian railways, gained during the tour which he had made in December through the courtesy of the Indian Railway Board, were related by Brigadier Langley. These were recorded in the article in our March 18 issue.

Locomotive Manufacture

The most impressive feature had been the Chittaranjan Locomotive Works. Output of locomotives during the year ended March, 1960, had been 175, nearly all of them "WG" class 2–8–2 heavy goods locomotives, and a few "WT" 2–8–4 tank engines. Recent orders included 36 "WP" 4–6–2 passenger locomotives, 10 3,000-V. d.c. electric, and 42 25-kV. a.c. electric locomotives. The excellent layout, modern machine tools, high standards of inspection, enthusiasm and *esprit-de-corps* of the officers were particularly striking. Notable features he had noticed were the welding of locomotive steel bar frames and of a steel boiler, and testing of welds in the X-ray room. The township was a triumph of planning.

The re-modelled marshalling yard at Moghalsarai, on the Eastern Railway, designed originally for a capacity of 1,400 wagons each way a day, was now handling an average of 2,500 each way daily, with a maximum of 3,200 wagons in 24 hr. The modernisation scheme now in progress, he stated, provided for a new hump and electro-pneumatic retarders in the up yard.

Other matters mentioned by Brigadier Langley and seen by him in the course of his tour were electrification at 1,500 V. on the Central Railway in the Bombay area, and at 3,000 V. and 25 kV. in Bihar and West Bengal, on the Eastern and South Eastern Railways, and the growth of traffic consequent on the growth of the steel industry and industrialisation generally in that area, and construction of new and improvement of existing lines to cater for it.

In the course of five runs on "WP" express passenger steam locomotives, three by day and two by night, he had been greatly impressed by the spotless condition of most of them. These engines were allocated either to one driver or to a group of three, according to shed practice and traffic requirements. Drivers took an intense pride in their engines, which carried the drivers' name plate, and urged maintenance staff to carry out all necessary running repairs promptly. At one shed the failure rate had been reduced from 1 in 40,000 to 1 in 100,000 miles. On the South Eastern (formerly Bengal Nagpur) Railway, where engines were pooled, user was very good.

A maximum of 60 m.p.h. was seldom reached on sections where the first signal on approaching the station, was the outer. Drivers reduced speed to 40–45 m.p.h. until they had verified the aspect which they had to see far off enough for them to stop if it was at danger. Warners were being introduced in some places and three- or four-aspect colour-light signalling was being installed on busy sections, but Brigadier Langley doubted if this would become universal for many years.

The general conclusion was heartening and enlightening. Many major works had been planned and executed by Indian railwaymen with comparatively little outside help.

There was a crusading spirit. Many officers worked long hours, but devotion to duty and enthusiasm carried them through.

Those present at the dinner were :—

Bengal Assam : Colonel G. C. L. Alexander; Messrs. J. H. Bavin, N. D. Calder, S. C. Chatterjee, H. D. Creedy, H. A. Joscelyne, R. G. Manson, J. N. E. Nagle, L. V. Pont, H. M. Read, A. E. Smaller, F. A. Smith,

Bombay, Baroda & Central India: Messrs. C. H. P. Allen, E. C. Armitage, J. S. Bearcroft, W. Blake, A. L. Brice, A. A. Brown, C. St. A. Dady, H. R. Eveleigh, E. Gardner, J. N. A. James, A. A. L. Lane, G. de P. Leeper, W. R. Maunder, P. D. Mitton, W. J. A. Moore, S. G Pick, Harish Chandu Sarin, G. T. Simpson, H. C. Towers,

Bengal Nagpur : Messrs. L. G. Bailey, H. V. Corks, W. H. C. Kelland, V. A. de la Novgerede, A. K. Southern, D. C. W. Tonkin, H. H. Waynford,

East Indian : Messrs. G. W. Browne, C. N. Burns, J. M. Fenton, J. C. Gibson, R. C. Harvey, T. T. Lambe, L. T. Madnani, Sir Robert Marriott, Captain E. M. Padwick, Messrs. H. W. Puttick, B. G. Smith,

Great Indian Peninsula : Messrs. S. Barber, H. H. C. Barton, C. M. Cock, E. L. Ensor. H. C. Evans, A. J. Frazer, R. J. Harris, L. A, Hoyle, E. Ingoldby, J. E. Jack, L. S. Johnson, Brigadier C. A. Langley, Messrs. S. Marchant. W. H. J. Pyne, J. R. Remington, Dr. C. H. H, Robertson, Mr. C. I. Routh, Sir Leonard Wilson, Messrs. J. M. D. Wrench, E. S. Woolridge,

Madras & Southern Mahratta : Sir Godfrey Armstrong, Messrs. S. M. Anwyl, W. Cathrow, H. Evans Edwards, J. S. Fiddes, G. H. Ford, W. G. Latham, R. de K. Maynard, G. W. Molle, Dr. H. J. More, Messrs. P. Morris, E. Perfect, C. G. Reynolds, B. A. Spencer, H. L. W. Stevens, B. J. Tapner,

Jodhpur : Messrs. J. P. Bardsley, K. Cantlie,

Nizam's State : Mr. H. G. Bengough,

North Western : Messrs. L. G. Asquith, H. C. S. Bennett, A. C. Brabson, C. Brereton, F. A. Coello, B. C. Drummond, G. P. M. Fitzgerald, W. E. Gelson, Colonel R. E. Gordon, Mr. W. E. Grant, Sir A. Griffin, Messrs. H. W. Huggins, T. McIntyre, B. Moody, Colonel D. McMullen, Messrs. A. A. Phillips, G. A. Plank, V. J. Reynolds, A. O. Roberts, M. J. B. Schofield, A. M. Sims, Lt.-Colonel W. J. W. Sorby, Messrs. H. Sparrow, W. G. Stephens, W. Strang, R. O. C. Thomson, A. Vieyra, J. R. Walton, C. E. Williams,

Oudh & Tirhut : Messrs. P. S. Bennett, W. D. Craig, J. V. Elson, L. D. Finnigan, R. H. Henry, H. E. Hypher, C. L. Jacobs, S. R. G. Livesey, W. Miller, Major G. E. Mumme, Messrs. R. D. B. Robathan, G. A. Rowlerson,

South Indian : Messrs. H. J. Crane, A. R. Edington, A. C. Flower, H. C. Hodgson, C. E. Gayes, C. R. Martingell, H. A. Reid, V. R. Riley, A. H. Smyth, and J. F. Wright.

Honorary Member : Sir William Stanier; guest : Mr. P. H. S. Drew.

U.I.C. Film Meeting

The annual meeting of the railway film officers organised by the International Union of Railways (U.I.C.) was this year held in Rome in May on the invitation of the Italian State Railways. The Swiss Federal Railways for many years has been the administration responsible for this activity, which permits only an exchange of views between those responsible for making railway films, and ensures their free exchange between the different European railways.

The films are divided into three categories: Documentary, instructional, and publicity. At Rome, British Transport Commission films were awarded first place in each of these three categories. The film "Three is Company," featuring rail travel in Britain for visitors from overseas, was regarded as the best of the 30 or so films exhibited by some 10 railways.

The opening ceremony was performed by Signor Santoni, Head of the Department of General Affairs, Italian State Railways, and Signor Branca, Deputy Director General, representing Signor Rissone, Director General, Italian State Railways, presided

Signor Santoni, Head of the Department of General Affairs, Italian State Railways, opening the U.I.C. meeting in Rome of railway film officers

at the official dinner. Amongst the administrations represented were the Danish State, French National, German Federal, Italian, Jugoslav, Netherlands, Norwegian State, Swedish State, Swiss Federal, and Berne-Loetschberg-Simplon Railways. The British Transport Commission was represented by Mr. Edgar Anstey, Films Officer, and Mr. C. E. R. Sherrington, Chairman of the Special Committee for the Exchange of Documents, U.I.C. The illustration shows Signor Santoni welcoming the delegates and, on his left, Dr. Max Strauss, Secretary General, Swiss Federal Railways, chairman of the meeting, and Mr. Sherrington.

Aluminium Symposium

The symposium on "The Use of Aluminium in Railway Rolling Stock" held in London at the Institution of Mechanical Engineers on May 27, and which is the subject of an editorial article in this issue, was opened by Mr. R. A. Smeddle, President of the Institution of Locomotive Engineers, which arranged the symposium jointly with the Aluminium Development Association.

Mr. Smeddle was chairman during the morning session which dealt with design and construction. Mr. W. Brining, President of the Aluminium Development Association, was chairman for the afternoon session in which the papers discussed dealt mainly with operation and service experience. Mr. D. C. Brown, President-elect of the Institution of Locomotive Engineers, acted as rapporteur to introduce five of the papers recording experience in oversea countries, namely: Canada, East Africa, France, Germany, and the United States. The majority of the authors were present so affording the opportunity for direct discussion on an international basis concerning design requirements and operational experience with aluminium stock. Other countries represented included Ghana, Holland, Hungary, Nigeria, Sierra Leone, Sudan, and Switzerland. The total attendance was about 260.

Supplementing Industrial Research

At a luncheon given by the Aluminium Development Association the same day at St. Ermins Hotel, Mr. Brining outlined the responsibilities of the Association which included supplementing the research programmes undertaken by individual companies in the aluminium industry. He was particularly pleased that the symposium had been timed to coincide with the Sixth London Conference on the Standardisation of Mechanical Equipment on Oversea Railways as this had enabled many chief engineers from abroad to attend.

The principal guest was Dr. Reginald Bennett, Chairman of the Parliamentary & Scientific Committee, who quoted the far-sighted example set by Britain in the ordering of large quantities of aluminium rolling stock for the London Underground system and the building by British Railways of aluminium diesel railcars. In fact, more aluminium passenger railway vehicles were running in this country than in any other, but, taking even pre-war aircraft designs for comparison, there was still much room for reduction in tare weight to achieve a satisfactory ratio between that and the load.

Exhibition at Strasbourg

During the afternoon session it was announced that an exhibition is to be held at Strasbourg, beginning on June 20, which will include over 40 aluminium rail vehicles contributed by several countries including Britain. Components manufactured in aluminium will also be displayed and there will be informal talks on some of the subject matter contained in the papers presented in London.

Those attending the symposium included Messrs. J. Ratter, Member of the British Transport Commission and President-elect of the International Union of Railways; R. C. Bond, Technical Adviser, B.T.C., representing the Institution of Mechanical Engineers; J. H. Brebner, Public Relations Adviser, B.T.C.; J. F. Alcock, W. H. W. Maass, and A. W. Manser, Vice-Presidents of the Institution of Locomotive Engineers; R. Arbuthnott, E. S. Cox, Sir William Stanier, and Mr. J. F. B. Vidal, Past-Presidents; Messrs H. H. C. Barton, M. G. Burrows, K. Cantlie, M. A. Crane, T. T. Lambe, J. H. P. Lloyd, A. E. Robson, and S. I. White, Members of Council; and G. T. Hart, Secretary.

Also present were Professor D. N. de G. Allen, Messrs. P. Bandet, R. A. Campbell, R. H. Dobson, G. Dupré, H. N. Edwards, Dr.-Ing. G. Gurtler, Messrs. R. Hahn, J. Hudson, G. A. Hunt, B. James, G. W. Lacey, Dr.-Ing. A. Mielich, T. C. B. Miller, Professor Sir Alfred Pugsley, Messrs. F. L. Stafford, J. F. Thring, Dr. E. G. West, Messrs. J. Willard, and D. W. Windle.

Questions in Parliament

Comparative Rates of Pay

Mr. Ellis Smith (Stoke-on-Trent—Lab.) asked the Minister of Labour on May 23, in view of the fact that industrial unrest was increasing in the engineering industry, to appoint an independent committee of inquiry to make a thorough examination of the wages, conditions, differentials received, and technical knowledge required of the skilled men in the industry, indicating in the report the relative rewards received compared with those of others engaged in services and non-productive and non-exporting industries.

Mr. Ellis Smith pointed out that in April, the Minister had sent him valuable statistical information. He asked that this be published in the Official Report so that "we all can see the policy of devaluation of skill which is being carried out by the engineering employers." He urged the Minister to reconsider the post-war policy, which all Ministers of Labour had pursued, of holding the rein rather than adopting the policy carried out by Ernest Bevin, of investigation before disputes.

Mr. Heath replied that the information consisted of a very large amount of material. Because of the interest subsequently expressed by Members, he would see whether it was possible for it to be published in the Official Report. As to industrial disputes, there was long-established machinery for dealing with negotiations, and it must be left to those who take part in them to deal with these matters.

Advances to Nationalised Industries

Mr. G. Nabarro (Kidderminster—C.) asked the Chancellor of the Exchequer on May 23 whether he would state estimated Exchequer advances to nationalised industries under Section 42 of the Finance Act, 1956, as amended for the year ending August 31, 1961, and the amount of the estimated advance to each of the seven nationalised industries concerned for that year to August 31, 1961.

Mr. Anthony Barber, Economic Secretary to the Treasury: I do not expect the total advances during the year ending August 31, 1961, to differ materially from the total for the current financial year which is estimated to be £482 million. I have already given the estimates of what each of the seven industries is likely to borrow from the Exchequer in the financial year, and this is the best available guide to an analysis of the estimated total of advances during the year ending August 31, 1961. There may, however, be unpredictable variations in the rate of advances to the seven individual industries, and it is for this reason that it is not possible to forecast more precisely.

Railway Services in Scotland

Sir David Robertson asked the Secretary of State for Scotland on May 24 whether he was aware that the Government's policy for the development of the Highland tourist industry conflicted with the B.T.C. decision to close down branch lines and main-line stations in the Highlands; and whether he would consult with the Commission to remove this difficulty.

Mr. Gilmour Leburn, Joint Under-Secretary of State, in a written reply: No. The Minister of Transport has sent the Scottish Transport Users' Consultative Committee the statement for which it asked reconciling the Government policy for the Highlands as set out in the White Paper of June, 1959, which includes the development of tourism, with the action taken by the B.T.C. to close certain stations and branch lines north of Inverness.

Sir David Robertson asked the Minister of Transport what was the Government's policy with regard to subsidising railways in the Highlands as an essential public service.

Mr. John Hay, Parliamentary Secretary, in a written answer: The future of the railways as a whole is at present under study. I regret therefore, that I cannot add to the statement on the subject made by the Prime Minister on March 10.

Withdrawals of Services

Sir David Robertson (Caithness & Sutherland—Ind. U.) asked the Minister of Transport on May 25 if he would refer to the appropriate consultative committee the consideration of the possibility of postponing for three months the closure of stations north of Inverness.

Mr. Marples, in a written answer: No, I do not think I should be justified in asking the Transport Users' Consultative Committee for Scotland to reconsider these proposals.

Freedom of Choice in Transport

Captain Pilkington (Poole—C.) asked the Minister of Transport on May 25 what steps he was taking to compel large bulk commodities to be conveyed by rail and not by road whenever practicable.

Mr. Ernest Marples: Apart from certain controls on the movement of abnormal loads by road, it is Government policy not to restrict freedom of choice between the different means of transport.

Mr. R. Mellish (Bermondsey—Lab.): The time is fast approaching when, in spite of party political prejudice on the benches opposite, the Minister will be compelled to adopt such legislation.

Mr. Marples: If one starts telling industry that it must use a mode of transport which is inconvenient and more expensive, we shall be handicapping the export trade.

Regional Railway Accountancy

Mr. F. Noel-Baker (Swindon—Lab.) asked the Minister of Transport on May 25 what was the name of the firm of chartered accountants which was studying the possibility of separate accounting for the railway Regions; and what were the criteria for their selection.

Mr. Ernest Marples: These arrangements are the responsibility of the B.T.C.

Mr. F. Noel-Baker: Why should all the activities of the B.T.C. be shrouded in an impenetrable fog of mystery? Why should its operations be kept far more secret from this House and the public than those of

private firms ? Is it not making nonsense of the statement of the Home Secretary the other day that we were to get more information about the nationalised industries at Question Time ?

Mr. Marples: The Act setting up the B.T.C. was the responsibility of the party opposite. In this particular respect the B.T.C. has been most helpful. It suggested the firm of accountants selected because of the firm's knowledge of the railway industry, and then instructed the firm. It was not for me to go behind the backs of the members of the Commission.

Mr. E. Popplewell (Newcastle-upon-Tyne W.—Lab.): Is it not ridiculous that this type of thing should be cloaked in secrecy when there is nothing to be gained by that ?

Mr. Marples: The question is about a firm of chartered accountants studying the possiblity of separate accounting. The B.T.C. appointed it, and there is nothing I can do about the matter.

Mr. F. Noel-Baker: In view of the entirely unsatisfactory nature of the reply, I beg to give notice that, among other matters, I shall endeavour to raise this question on the adjournment.

Rail Inquiry and Inland Waterways

Colonel Sir Leonard Ropner (Barkston Ash—C.) asked the Minister of Transport on May 30 what steps he had taken to ensure that the Special Advisory Group on the British Transport Commission would take into account the need to provide effective arrangements for consultation between British Railways and inland waterway carriers as to rates for traffics for which inland waterways could cater economically.

Mr. Ernest Marples, in a written answer: The terms of reference of the Advisory Group are wide, and I am sure that the Group will take account of all relevant factors. They have already expressed their readiness to receive representations from interested parties.

Contracts and Tenders

Alco Products Incorporated has received an order from the Seaboard Air Line Railroad for 10 1,800-h.p. "DL-701" diesel-electric locomotives. The value of the order is $1,800,000.

The International General Electric Company has received an order from Cornigliano S.p.A. of Genoa, one of Italy's largest steel mills, for four 65-ton industrial type diesel-electric locomotives.

The Victorian Railways has placed a contract with Australian Electrical Industries Pty. Ltd. for 10 1,500-kW. 1,500-V mercury-arc rectifiers with associated 22-kV. main transformers. The rectifiers will be supplied by A.E.I. (Rugby) Limited.

The Export Services Branch, Board of Trade, has received calls for tenders as follow :—

From Western Australia :

2 diesel-electric or diesel-hydraulic shunting locomotives, minimum net h.p. required for traction is to be 400.

The issuing authority and address to which bids should be sent is the Secretary, Fremantle Harbour Trust, Cliff Street, Fremantle, Western Australia. The closing date is July 15, 1960. The Board of Trade reference is ESB/14235/60.

From Sudan:

800 rolled-steel tyres for locomotive wheels.

The issuing authority and address to which bids should be sent is the Controller of Stores, Sudan Railways, Atbara. The tender No. is 2175. The closing date is June 27, 1960. The Board of Trade reference is ESB/13552/60.

From Korea :

3,000 bridge sleepers, 9 in. by 9 in. by 10 in., untreated mixed hardwood

147,000 cross sleepers 7 in. by 9 in. by 8 in., untreated mixed hardwood.

The issuing authority and address to which bids should be sent is the Office of Supply, Government of the Republic of Korea, Seoul, Korea. The tender No. is 0725/M/1. The closing date is June 8, 1960. The Board of Trade reference is ESB/13572/60/I.C.A.

Further details relating to the above tenders together with photo-copies of tender documents, unless otherwise stated, can be obtained from the Branch (Lacon House, Theobald's Road, W.C.1).

Notes and News

B.I.C.C. Dundee Branch New Telephone Number.—As from June 11, the telephone number of the Dundee Branch, British Insulated Callender's Cables Limited, will be Dundee 25726/7.

Farewell Gift to E.A.R. & H. Deputy General Manager.—Mr. W. Urquhart, Deputy General Manager, East African Railways & Harbours, who, as recorded in our issue of May 6, has retired after 34 years' service, has been presented with a table lamp as a farewell gift by the General Manager, Sir James Farquharson. Mrs. Urquhart received a dinner gong. The lampshade which was painted by Mr. K. G. Matthews, a member of the Chief Engineer's Architects office, was described by Sir James Farquharson as "an Odyssey of places in which Mr. Urquhart has served."

Nyasaland Railways Limited Results for 1959.—A preliminary statement shows that the group net operating profit, before taxation, of Nyasaland Railways Limited for the year ended December 31, 1959, was £388,804 against £486,521 for the preceding year. With other income and provisions no longer required and balance brought forward this makes £517,719 (£627,389). A dividend is recommended on the ordinary shares of 6 per cent, as for 1958. This absorbs £55,127 (as for 1958) and after other deductions the amount carried forward is £69,219 (£92,640).

British Electrical Power Convention.—The twelfth British Electrical Power Convention was held at the Pavilion, Bournemouth, from May 30 to June 2. In a paper on "The New Horizon—Electrical Manufacture," Mr. H. G. Nelson, Managing Director, English Electric Co. Ltd., stated that electricity consumption had risen steadily over the years in the steel industry. Not only manufacturing, but rail traction the life-blood of British Industry was being revolutionised by electrification. British Railways had 350 main-line diesel-electric locomotives and 900 diesel-electric shunting locomotives in service and within the next three to four years the total of all types would have risen to 3,000.

Southern Region Fire-fighting Competition, 1960.—British Railways, Southern Region, held its fire-fighting competition finals in heavy rain recently at the Surrey County Fire Brigade Headquarters, Reigate. Seventeen teams, four of them of women, met after having won area contests for which 147 teams entered, all of them part-time volunteers. Mr. A. H. Johnstone, the Chief Fire Officer, Surrey Fire Brigade, complimented the teams on their high standard and said that the low incidence of penalty points (only three penalties imposed during the 17 drills) was proof of efficiency. Challenge shields and cash awards were presented by Mr. C. P. Hopkins, General Manager of the Region, to the winners and runners-up. The winners were: Three-Man Hydrant Drill, Regional Accountant, Audit Department, Dorking North No. 3; Two-Man Extinguisher Drill, Brighton, Outdoor Machinery Department; Ladies' Extinguisher Drill: District Engineer's Office London (East) No. 1 Purley; Trailer Pump Drill: Ryde Pier Head Station.

North Eastern Region, Whitsuntide Services.—In the North Eastern Region, British Railways, during the Whitsuntide period there will be 519 additional trains. Of these 307 are relief and 212 excursion trains; 174 of the relief trains will originate in the Region,

Sir James Farquharson, left, presenting the farewell gift to Mr. Urquhart

101 will run into and terminate within the Region, whilst 32 are trains passing through but serving stations within the Region. A Sunday service will operate on Whit Sunday. On Whit Monday and Tuesday, an augmented weekday service will operate, though some morning business trains will be cancelled.

Films on Materials Handling.—The National Joint Committee on Materials Handling, a co-ordinating committee of professional and other non-trading research and development associations interested in this subject, published in May, 1958, a list of films on materials handling, giving size, running time, a brief synopsis, and the source from which each could be obtained. The list has now been revised and augmented to include particulars of approximately 100 films. Copies, price, 2s. post free, may be obtained from the Secretary, National Joint Committee on Materials Handling, 32, Watling Street, London, E.C.4 : tel. City 7045.

London Midland Region Stations to be Closed.—Bay Horse Station, on the Euston-Carlisle main line of the London Midland Region, British Railways, between Lancaster Castle and Preston will be closed for passenger and parcels traffic from June 13. Passengers should book to Lancaster or Preston, thence by buses of Ribble Motor Services Limited. Parcels and passenger train merchandise will be dealt with at Lancaster. Althorp Park, between Northampton Castle and Rugby Midland, will be closed on the same date for passengers, who should book to Northampton Castle or Long Buckby and travel thence by buses of the Birmingham and Midland Motor Omnibus Company, Limited, and the United Counties Omnibus Co. Ltd. Armitage Station, between Lichfield Trent Valley and Stafford, also will be closed for passengers and parcels traffic. Passengers can book to Rugeley or Lichfield whence buses are available of the Birmingham and Midland Motor Omnibus and Green Omnibus Co. Ltd. Parcels and passenger train merchandise will be dealt with at Rugeley.

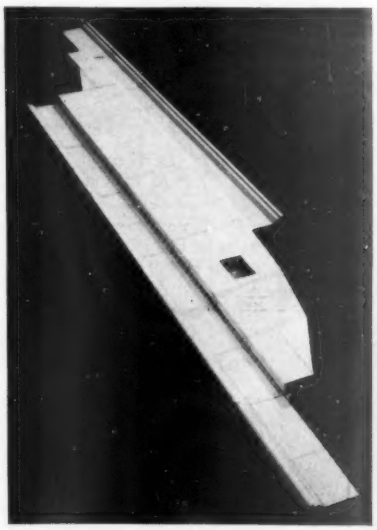
Presentation to Sir Reginald Wilson.—To mark the five years as Chairman of the Eastern Area Board, B.T.C., of Sir Reginald Wilson, who is now Chairman of the London Midland Area Board, the Chairman, Members, and Public Relations Adviser, and Secretary of the Eastern Area Board, the officers of the Eastern Region, British Railways, presented him with gold cuff links, studs, and buttons. The illustration shows (left to right): (standing) Messrs. H. C. Johnson, General Manager, Eastern Region; Alastair MacLeod, Member, Area Board; G. A. V. Hayes, Secretary, Area Board; J. B. Peile, Member, Area Board; Norman Hamilton, Public Relations Adviser; A. K. Terris, Chief Civil Engineer; (seated) Sir Henry Willink, Member, Area Board; Sir Reginald Wilson; Maj.-General G. N. Russell, Chairman, Area Board; and Messrs. Jack Tanner and A. F. Pegler, Members, Area Board.

Zagreb Autumn Fair.—British firms have reserved space in the British section of the Zagreb Autumn Fair, which is being sponsored by the Board of Trade. Details of cost of floor space and so on may be obtained from the official agents, Auger & Turner Group Limited, Thorn House, Upper St. Martins Lane, W.C.2: tel. Temple Bar 9081.

London Firms Switch to Staggered Working Hours.—Two more large London firms employing more than 4,500 staff have gone over to staggered hours to help ease rush-hour travel. After discussions between the London Travel Committee and leading insurance companies in the City, 3,000 staff of the Commercial Union group are now starting work at 9.15 a.m. and finishing at 4.45 p.m., to avoid the height of peak hours, 9.30 a.m. and 5 p.m. At the General Electric Company of Holborn, over 1,500 staff now finish work 10 min. earlier, at 5.15 p.m. The London Travel Committee reports also that more engineering firms have altered their hours in changing to their new 42-hour week.

Withdrawals of Passenger Facilities in L.M. Region.—The passenger train service between Burton-on-Trent and Tutbury, London Midland Region, British Railways, will be withdrawn on June 13. Burton-on-Trent and Tutbury stations will remain open and deal with traffic as at present. Local passengers between can travel by buses of the Trent Motor Traction Co. Ltd. and Stevensons Limited. Passengers who formerly travelled from Burton-on-Trent or Tutbury *via* the branch to stations beyond will have the alternatives of the bus service and continuing their journey by rail or of travelling by rail throughout *via* Derby and being charged accordingly. Through passengers can travel *via* Derby. On the same date the passenger train service between Seaton (Rutland) and Uppingham will be withdrawn. Passengers can book to Seaton and travel thence by buses of the Birmingham & Midland Motor Omnibus Co. Ltd., United Counties Omnibus Co. Ltd., or Central Coaches. Parcels and passenger train merchandise will continue to be dealt with as at present. Uppingham Station will be opened for special trains in connection with Uppingham School.

Model Bridge in Epoxy Resin.—The illustration shows a scale model (¼ in. to 1 ft.) of the recently-constructed bridge at London Road Station, Manchester. The model is 6 ft. in length and was cast in Araldite epoxy resin by the McKinlay Electrical Manufacturing Co. Ltd. for Mr. A. N. Butland, the Chief Civil Engineer of the London Midland Region of British Railways. To simulate the final prestressed concrete structure, the model was supported on four points, and deflection tests were then carried out. The use of Araldite enabled accurate observations to be made, and the figures obtained assisted in the advanced design of the actual bridge in prestressed concrete. The main box girder portion carries a passenger platform, with footbridge, luggage lift and buildings; the railway tracks are cantilevered from the central portion.



Scale model in Araldite epoxy resin of bridge at London Road Station, Manchester

After the presentation to Sir Reginald Wilson, on his relinquishment of the chairmanship of the Eastern Area Board

Western Region Fire Drill Competitions.—Thirty teams from all parts of the Western Region of British Railways recently competed in the finals of the Regional Fire Drill competitions at Marylebone Goods Depot. The ladies' extinguisher drill was won by Swindon Regional Accounts Department, and the two-man bucket-extinguisher drill by Brentford Dock, Traffic Department (Commercial). The three-man hydrant drill and the five-man trailer pump drill were both won by Swindon Works, Chief Mechanical & Electrical Engineer's Department.

Fare Increases in the Western Region.—Some passenger ordinary fares in the Western Region, British Railways, will be increased on June 12. For journeys up to 200 miles the increase will be ¼d. a mile to a basic charge of 2½d. a mile. Over 200 miles the increase will taper down to nil for 272 miles or more. First class fares will be roughly 50 per cent over second class, as now. Mid-week return fares will not be increased this season. The Western Region Rover Ticket will remain at £9 10s. second and £14 first class; also the Freedom of Wales and West of England Rover Tickets at £5 second and

£7 10s. first class. Holiday runabout tickets will continue to be sold at the existing charges already announced; these afford unlimited journeys in defined areas during seven consecutive days. Charges in respect of Western Region Car Tourist services from London to Newton Abbot and St. Austell will remain unchanged. For the present there will be no increase in cheap day fares except in one or two isolated instances but it may be necessary for these fares to be adjusted later.

Open Steel Plank for Railway Maintenance Platforms.—Mobile platforms, light enough to be lifted from one track to another, are in use by British Railways at Crewe, for

Railway maintenance platforms built with Dexion materials

maintenance work on main-line diesel engines. The platforms were built by British Railways staff with Dexion slotted angle and open steel plank. The same materials were used to construct cleaning platforms designed to pass between roof supports and the sides of locomotives.

Anglo-Soviet Trade Agreement.—The Board of Trade has announced that a delegation from the Soviet Union will be arriving in this country on June 6 to begin discussions about the operation of the Anglo-Soviet Five-Year Trade Agreement of May, 1959. Article 5 of the Agreement provided that representatives of the two Governments would meet at least once a year, alternately in London and in Moscow, to examine the carrying out of the provisions of the Agreement and, if necessary, to prepare recommendations to one or both Governments for the further improvements of trade relations between the two countries. The Soviet delegation will be led by Mr. P. N. Kumykin, a Deputy Minister of Foreign Trade. The United Kingdom delegation will be led by Mr. F. J. Erroll, Minister of State in the Board of Trade.

Rolls-Royce Limited, Film, "The Magic of a Name."—A 25-min. colour film, "The Magic of a Name," sponsored by Rolls-Royce Limited, was given its première recently at the Waldorf Hotel, London. It indicates the international scale on which the four main divisions of the company operate and the constant expansion of their interests with particular emphasis on research and development. The wide uses of Rolls-Royce diesel power and the operational and service aspects of a range of engines designed around the same basic components are shown to good advantage. Railway traction receives only brief treatment compared with the gas turbine aero engine field. Copies on 16 and 35 mm. are available to recognised organisations through Sound-Services Limited, Wilton Crescent, London, S.W.19. Foreign language versions will include French, German, Spanish, and Portuguese.

Royce Electric Furnaces Limited Change of Address.—Royce Electric Furnaces Limited has changed its address to Albert Drive, Sheerwater, Woking, Surrey; tel. Woking 5401-4.

Installation of Automatic Warning System in the North Eastern Region.—The installation of the automatic warning system track apparatus has now been completed between Durham and Newcastle by the North Eastern Region of British Railways. This means that the East Coast main line between Newcastle and Kings Cross, a distance of 268 miles is now fully equipped. Work is going ahead on the installation of the automatic warning system on sections of the East Coast main line north of Newcastle still to be equipped. Under this system, the engine driver when approaching each section of line receives in the engine cab both visible and audible indications of the state of the signals ahead. When these are at danger, unless the warning is acknowledged by the driver, the brakes are applied automatically after an interval of 3 secs. So far more than 300 locomotives have already been fitted with the automatic warning system equipment in the North Eastern Region.

Sudan Ministers Visit Vulcan Foundry Works.—Brigadier Mohamed Ahmed Irwa, Sudanese Minister of Commerce, Industry & Supply, with the Industrial Minister, Sayed Mansour Mahgoub, recently visited the Vulcan Foundry Works of the English Electric Co. Ltd. at Newton-le-Willows. The illustration shows Brigadier Mohamed Ahmed Irwa (with dark spectacles) and Sayed Mansour Mahgoub, and with them (from left to right) Mr. J. E. W. Grainge, English Electric Co. Ltd.; Mr. G. Collingwood, Managing Director of the Vulcan Foundry; Mr. H. J. Hulme, Chief Engineer; and Mr. T. F. J. Lattimer, Board of Trade. In the background is an 1,850-h.p. diesel-electric locomotive, one of 15 being built by the English Electric Co. Ltd. for Sudan Railways and described in our February 26 issue.

Australian Company.—Clyde Industries Ltd., of Sydney, well known as a builder of diesel locomotives and other railway equipment through its subsidiary, Clyde Engineering, has formed a new subsidiary, Lease Plan (Inc.) Pty. Ltd., to supply on lease equipment produced within the Clyde group. This company can also purchase any type of capital equipment from other suppliers, and lease it to users.

Increased Car-Tourist Traffic.—Advance bookings by motorists for British Railways, Western Region, Car Tourist Services show a substantial increase compared with previous years. No fewer than 369 cars and 1,093 passengers have been booked to date for the London to St. Austell (Cornwall) service, an increase of 25 per cent cars and 23 per cent passengers compared with last year. On the London to Newton Abbot service, the advance bookings of 82 cars and 234 passengers represent an increase of 55 per cent cars and 65 per cent passengers over 1959.

Delegates to Standardisation Conference.—The following delegates attended the Sixth London Conference on the Standardisation of Mechanical Equipment on Oversea Railways: Messrs. J. Hudson, Chief Mechanical Engineer, East African Railways & Harbours; G. H. Binnie, Chief Mechanical Engineer, and F. A. O. Phillips, Locomotive Works Superintendent, Nigerian Railway Corporation; N. W. Porteous, Deputy Chief Mechanical Engineer, and D. Q. Annoh, Locomotive Superintendent, Ghana Railway & Harbours; W. Haresign, Works Manager, Sierra Leone Railway; Sayed Mohamed El Fadl, General Manager, and Sayed Ahmed El Amin Hummeida, Chief Mechanical Engineer, Sudan Railways; A. Reidinger, Mechanical Engineer, Sudan Embassy; W. H. W. Maass, Advisory Engineer, South African Railways; P. S.

Sudanese Ministers at the Vulcan Foundry Works

Palmer, Rhodesia Railways; A. B. Henderson and G. M. Wells, Nyasaland Railways. The Locomotive & Allied Manufacturers' Association was represented by Messrs. G. Collingwood, Chairman, and W. Pickett, Technical Assistant to the Director. The Railway Carriage & Wagon Building Association was represented by Messrs. N. Schofield of the Birmingham Railway Carriage & Wagon Co. Ltd., and A. Davis and F. Bonneres of the Metropolitan Carriage & Wagon Co. Ltd. Representing the British Standards Institution were Dr. E. L. Diamond, Divisional Chief Technical Officer, and Mr. A. D. Smalley, Technical Officer. Editorial reference is made elsewhere in this issue.

Structure of Metals and Intermetallic Compounds.—Professor Linus Pauling, of the California Institute of Technology, has accepted an invitation from the Metal Physics Committee of the Institute of Metals to give a lecture during his forthcoming visit to Britain. His subject will be "The Structure of Metals and Intermetallic Compounds" and the lecture will be delivered at the Royal Institution, Albemarle Street, London, W.1, at 6.30 p.m. on July 25. Visitors will be welcome and tickets are not required.

Wild-Barfield Furnace for Permanent Magnet Association.—An NRC vacuum-induction furnace with a steel capacity of 12-17 lb. for the Permanent Magnet Association is under construction in the works of Wild-Barfield Electric Furnaces Limited of Watford. It will be used primarily for melting in vacuo aluminium-nickel-cobalt-iron alloys for research work into permanent magnet materials. Equipment includes mechanism for viewing charging, alloying, pouring, cover lifting, and bridge breaking. The pumping system is capable of obtaining pressures down to 0·5 microns. An equipment generally similar will be on the stand of the manufacturer at the forthcoming International Machine Tool Exhibition at Olympia, London.

British Mining Equipment Export Association.—Members of this association at present include the following companies: Edgar Allen & Co. Ltd., Cable Belt Limited, the Cementation Co. Ltd., Crawley Industrial Products Limited, John Davies & Son (Derby) Limited, the Distington Engineering Co. Ltd., Dowty Mining Equipment Limited, Eimco (Great Britain) Limited, the General Electric Co. Ltd., Hardypick Limited, Hawker Siddeley Brush International Limited, Hayden-Nilos Limited, Head Wrightson Colliery Engineering Limited, Austin Hopkinson & Co. Ltd., International Combustion (Export) Limited, Joy-Sullivan Limited, Martin, Black & Co. (Wire Ropes) Limited, the Mining Engineering Co. Ltd., Nortons-Tividale Limited, Oldham & Son Ltd., Bruce Peebles & Co. Ltd., A. Reyrolle & Co. Ltd., Sheepbridge Equipment Limited, Siemens-Schuckert (Great Britain) Limited, Simon-Carves Limited, Siskol Machines Limited, Richard Sutcliffe Limited, John Tinsley Limited, Hubert H. P. Trist & Co. Ltd., Unifloc Limited, Victor Products (Wallsend) Limited, M. B. Wild & Co. Ltd., Hugh Wood & Co. Ltd. The address of the Association is Boundary House, 7–17 Jewry Street, London, E.C.3.

North Eastern Region Arts & Crafts Exhibition.—The British Railways Staff Association (North Eastern Region) Seventh Annual Exhibition of Arts & Crafts was staged in the York Railway Institute on May 19-21. The 359 entries from 106 exhibitors, 35 more than last year, included oil paintings, water colours, black and white drawings, photographs and colour transparencies, and soft furnishings. The exhibits were judged by Mr. D. L. Donn, Mr. J. Arnup and Mrs. M. Hatfield, by courtesy of York School of Arts & Crafts (all entries except photographs) and by Mr. G. Denham (photographs). Certain winning exhibits will go forward to the inter-Regional finals to be held in London on June 16-18. Mrs. H. A. Short, wife of the General Manager, North Eastern Region, British Railways, presented the major awards on May 21.

L. M. Region Ambulance Competitions.—The finals of the men's and women's ambulance competitions in the London Midland Region, British Railways, were held at the Belle Vue Gardens, Manchester, on May 18. The Camden Goods "A" team won the men's competition, with a total of 508½ points out of 600; the runners-up were St. Pancras Goods "A" (461½ points) and Nuneaton (386). In the women's competition, Euston "B" were the winners with 438 points out of 600, followed by Manchester London Road (411) and Stoke (390). Birmingham Lawley Street won the "pairs" competition, with 161 points out of 200, followed by Kendal (155) and Garston (155). Lady Wilson, wife of Sir Reginald Wilson, Chairman of the London Midland Area Board, B.T.C., presented the trophies and prizes, and Mr. H. Aidley, Regional Establishment & Staff Officer, presided.

Forthcoming Meetings

June 9 (*Thu.*).—Railway Students' Association. Visit to Grove Park Car Depot. Meet at Grove Park Station booking hall at 6.15 p.m.

June 10 (*Fri.*).—Permanent Way Institution, East Anglia Section. Visit to Ford Motor Co. Ltd., Dagenham.

June 10 (*Fri.*).—The Railway Club, at the Royal Scottish Corporation, Fetter Lane, E.C.4, at 7 p.m. Paper on "The Thetford & Watton Railway and its associates," by Mr. B. D. J. Walsh.

June 11 (*Sat.*).—Railway Students' Association. Visit to Stewarts Lane Depots. Meet in Queen's Road (Battersea) Station booking hall at 6.15 p.m.

June 15 (*Wed.*).—Institution of Civil Engineers, at Great George Street, Westminster, S.W.1. Conversazione.

OFFICIAL NOTICES

PERMANENT WAY DESIGN ASSISTANTS required for preparation of detailed working drawings of permanent way junction work design, setting out and surveys. Knowledge of permanent way work in tunnels an advantage. Salary ranges:—
Class 1 £989-£1,028 p.a.
Class 2 £855-£951 p.a.
Applicants for the class 1 post should possess Higher National Certificate, or be undertaking a course of study, and should be experienced in the control of staff. For the class 2 post Ordinary National Certificate is desirable.
TECHNICAL ASSISTANTS also required with general grounding in civil engineering, and ability to use theodolite and level and undertake land surveys. Some knowledge of permanent way design advantageous. Students of Institution of Civil Engineers preferred.
Salary range £460 at 21 years rising to £805. Additional payments for certain recognised qualifications.
Medical examination; free travel; contributory superannuation scheme.
Applications giving age, qualifications and details of previous experience to Staff & Welfare Officer (F/EV. 793/3), LONDON TRANSPORT EXECUTIVE, 55 Broadway, S.W.1.

SHOTBLASTING—METAL SPRAYING—COATING. Epikote, araldite, P.T.F.E., P.T.F.C.E., Polythene, P.V.C., Neoprene and Hypalong coatings applied on Site or at Works.—LOYNE LIMITED, Margaret Street, Ashton-under-Lyne, Lancs. Tel. No. ASH 4551/2/3.

Railway Stock Market

Encouraged by more cheerful views of the outlook, which were confirmed by the latest review of the National Institute of Economic & Social Research, stock markets have shown a strong upswing with industrial shares in the lead. It is now being widely predicted that the question of a further increase in the credit squeeze may not arise until the autumn, the assumption being that for the present the inflation danger is being curbed. It is possible that the next figures from the banks will show a small reduction in bank loans; those recently issued disclosed that the rate of increase in bank loans had fallen off, the rise being £26,000,000 compared with a jump of £98,000,000 a month before.

Foreign rails have generally held steady, apart from Antofagasta, sentiment in regard to which was affected by the Chilean earthquake news. Antofagasta ordinary stock was 12⅞, compared with 14¼ a week ago, and the preference declined from 30 to 28½; the 4 per cent perpetual debentures held steady at 45½, while the 5 per cent (Bolivia) debentures were firm at 105½.

Chilean Northern 5 per cent first debentures were again quoted at 59½. Costa Rica ordinary stock was again 37 with the 6½ per cent first debentures 90 and the 6½ per cent second debentures 110. Brazil Railway bonds were 6½, Guayaquil & Quito assented bonds 77 and Paraguay Central prior debentures 15½, while Sao Paulo Railway 3s. units remained at 1s. 3d. and United of Havana second income stock kept at 6 with the consolidated stock at 1. Elsewhere, International of Central America was again $24 with the preferred a point better at $111. Mexican Central "A" bearer debentures were fractionally higher at 59½.

Canadian Pacifics reacted from $46½ to $45¾, while the preference stock eased to 59 and the 4 per cent debentures to 63⅛xd. White Pass shares were $12¼, compared with $12½ a week ago.

West of India Portuguese remained at 111 with the 5 per cent debentures 93½. Barsi Light Railway ordinary stock moved up from 16 to 18.

The shares of locomotive and engineering firms reflected the better market trend. Beyer Peacock 5s. shares have firmed up from 7s. 4½d. to 7s. 9d., Gloucester Wagon 10s. shares from 10s. 9d. to 11s., while North British Locomotive held steady at 9s. and elsewhere, Wagon Repairs 5s. shares were 12s. 7½d. compared with 12s. 4½d. a week ago.

Westinghouse Brake rose further from 49s. to 50s. and in other directions, Birmingham Wagon have held up well at 32s. 4½d. G. D. Peters were better with business up to 21s.

Reflecting the general improvement in markets, Pressed Steel 5s. shares have risen from 32s. 9d. a week ago to 34s. 3d. and Stone-Platt, helped by the maintained dividend, strengthened from 52s. 9d. to 55s. Dowty Group 10s. shares rose on balance from 35s. to 37s. 3d. Clarke Chapman improved from 48s. to 49s. 6d. and Babcock & Wilcox rallied from 36s. 4½d. to 38s. 4½d. while Ruston & Hornsby at 28s. 6d. held nearly all their recent improvement. Vickers were good with a rise on balance from 32s. 3d. to 34s. 6d., while T. W. Ward put on 2s. 6d. at 145s., but steel shares, though higher, did not keep best prices, the disposition being to await the Richard Thomas share offer. Broom & Wade moved up from 19s. 4½d. to 21s. 6d. Holman Bros. 10s. shares were again 22s.

Associate Electrical rose from 54s. 1½d. to 57s. 9d., English Electric from 38s. 10½d. to 41s. 1½d. and General Electric from 37s. 10½d. to 40s. 9d.